Menschen – Kulturen – Traditionen

Band 1 / Beginnings – New Research in the Appearance of the Neolithic between Northwest Anatolia and the Carpathian Basin

ForschungsCluster 1

Von der Sesshaftigkeit zur komplexen Gesellschaft: Siedlung, Wirtschaft, Umwelt

Menschen – Kulturen – Traditionen

Studien aus den Forschungsclustern
des Deutschen Archäologischen Instituts

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Beginnings – New Research in the Appearance of the Neolithic between Northwest Anatolia and the Carpathian Basin

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Editorial

Zur Erforschung zentraler Themen der frühen Menschheitsgeschichte haben sich Wissenschaftlerinnen und Wissenschaftler des Deutschen Archäologischen Instituts unter gemeinsamen Fragestellungen quer zu einzelnen Zweiganstalten vernetzt. Derzeit wird in fünf Clustern in transdisziplinärer Orientierung und unter Einbeziehung von Spezialisten anderer Forschungsinstitute und Kooperationspartner im In- und Ausland geforscht.

Es geht dabei zum einen darum, Prozesse zu verstehen, die sich in spezifischen Veränderungen der Siedlungsweise, der Wirtschaft und der Umwelt fassen lassen und die auf einen Übergang zur Sesshaftigkeit und Entwicklung komplexer Gesellschaften schließen lassen, wie es im ersten Forschungscluster aufscheint. Bei diesen dynamischen Prozessen sozialer und kultureller Veränderungen spielen technische und soziale Innovationen mit hinein, denen sich das zweite Forschungscluster widmet. Die in ausschlaggebenden Veränderungen von Gesellschaften entstehenden räumlichen Strukturen von Herrschaft und politischer Organisation spiegeln sich in Bauten wie Palästen oder in Markierungen von Territorien wider, mit denen sich das dritte Forschungscluster beschäftigt. Mit den Heiligtümern, Ritualen, ihren Kontinuitäten und Veränderungen, deren Untersuchung zentral ist für das Verständnis antiker Kulturen, setzt sich das vierte Cluster auseinander. Forschung ist immer auch zeitgebunden. Aus diesem Grund stellt sich das DAI in einem fünften Cluster der Erforschung der komplexen Zusammenhänge der eigenen Geschichte und der Geschichte der Archäologie im 20. Jahrhundert.

Das Unternehmen der wissenschaftlichen Vernetzung wurde großzügig durch Zuschüsse im Rahmen des Forschungspaktes der Bundesrepublik Deutschland ermöglicht.

Nun können wir mit diesem Band erste Früchte der gemeinsamen Forschungsarbeit vorlegen. Die Ergebnisse der Arbeit der Cluster sind natürlich nicht allein in diesem Sammelband zu fassen. Eine Vielzahl von Aufsätzen und Monographien dokumentieren, wie die gemeinsamen Fragen auch in die konkreten Projekte zurückgreifen. Durch die Vernetzung ist eine anregende Dynamik entstanden, die es in den nächsten Jahren stetig weiterzuentwickeln gilt.

Berlin, im Dezember 2011 Friederike Fless

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Neolithization Between Northwest Anatolia and the Carpathian Basin – an Introduction

by Raiko Krauß

In the past years (since 2006) the German Archaeological Institute (DAI) has adopted a strategy which has seen all its research projects worldwide turn to pursue some common basic questions. Perhaps the most appealing aspect of this approach from the global perspective lies in the study of congeneric phenomena in quite different cultural settings. This new approach saw many ongoing research projects pooled into five different research clusters with a focus on issues of technical and social innovation (Cluster 2); the formation of political space (Cluster 3); the structure and ritual of sanctuaries, their continuity and change (Cluster 4); and the history of the German Archaeological Institute in the Twentieth Century (Cluster 5). The first of the research clusters however is dedicated to the most significant change in human cultural history, the emergence of sedentary communities and the resulting development of complex societies. This process is currently being studied in the areas of settlement, economy, and tangible results are bearing testament to anthropogenically induced environmental change. The transition from hunting and gathering communities to sedentary farmers and herders in the Old World appears at first as a linear and irreversible process. After all we know today, this development reached Europe in a fully-developed state, i.e. together with all the components of the so-called Neolithic Package, including a productive mode of economy, permanent settlements, as well as pottery and ground stone tool production. At least in the case of Greece, the existence of an aceramic phase of Neolithic settlement can no longer be upheld, as Agathe Reingruber explains again in her contribution to this volume. Instead Greece and the Balkans are both characterized by a comparable development inspired by western Anatolia, but which appears to have begun earlier in these regions than in areas to the north of the Aegean. The dynamics and direction of the spread of Neolithic economies has long been subject of archaeological research, although many of the details are still a matter of discussion and debate.

Neolithization from a Global Perspective

In concrete terms, the present conference volume is devoted to the pivotal question of what constituted the beginnings of this development at the geographical transition from Asia Minor to southeast Europe. We are very pleased that we are able to discuss this topic within the frame of the aforementioned DAI research cluster, especially as the cultural scope of this phenomenon can only be truly understood and adequately appreciated in a global context. In fact, because we are dealing with a classical region of Neolithic research, we are providing vital impulses to the ongoing debate. Furthermore, due to the observation that Neolithization apparently occurred independently in different parts of the globe, it is a process which can be understood as an inherent anthropological feature. Indeed, it is always fascinating to observe how successful technical and economic achievements spread worldwide within a very short space of time, resulting in the development of economic areas and large-scale communication spaces – complex phenomena which we nowadays tend to subsume under the heading ›Globalization‹. However, in the case of the Neolithic this certainly does not imply the unleashed expansion of capital markets and goods traffic, particularly as trade in premonetary societies should definitely not be understood as purely capital-oriented and lacking close ties with associated producing communities. Rather, we are dealing with local and far-reaching interweavements at different levels, e.g. in culture, religion, settlement patterns and funerary traditions, of which economy is but one. One might argue that the spread of technical innovations is just as inherent to the nature of universal human nature as is the dispersal of the human species itself, initially over the entire globe – into the most inhospitable regions – and in the near future even beyond. Indeed, we are currently witnessing the very beginnings of human expansion into space. This raises the question whether the evolution from mobile-foraging to sedentary-producing societies should be understood as governed by natural laws and principles, i.e. that such a development is fixed by prevailing ecological and biological framework conditions. Alternatively, of course, one might instead ask whether such processes are instead triggered by very specific impulses. Concerning these issues, we are still at the very beginning. Nevertheless, in recent years our existing picture of early dispersal of Neolithic lifeways from Anatolia to Europe has been significantly supplemented, particularly by discoveries of first Neolithic sites in large and archaeologically unchartered regions. Whereas in the past we were reliant upon comparisons made over a wide area between the southwest Anatolian Lake District and the Balkans, new excavations now allow for comparisons with northwest Anatolia, equivalent to a reduction of the distance involved by at least a half. Thereby the interrelationships between the cultural sequences of both these large areas are now much clearer, also due to the higher and more precise resolution of absolute dates that have become available for individual archaeological layers.

Neolithization of Southeast Europe from Anatolian Roots

Whereas some old-established similarities observed in the cultural development in the Balkans and Anatolia have been confirmed, many others have since been disproved and permanently put to rest. It is thus quite clear now that there is no connection between the monochrome Neolithic of the southwest Anatolian Lake District and the same named earliest Neolithic in southeast Europe, both these phenomena being separated by a significant temporal-offset; by the time the first pottery appeared in southeastern Europe, the period of predominantly ›monochrome‹ ceramics in southwest Anatolian assemblages, for example at the well-known site of Hacılar, had long passed. At this stage, painted wares made up more than a half of the material in assemblages from this region[1]; painted pottery was fast approaching its zenith. Vessel forms which were to become characteristic for the Southeast European Early Neolithic developed in western Anatolia from belly-shaped vessel bodies, models for which might be sought in leather containers. Specific pottery techniques and decorations typical for earliest Neolithic pottery in the Balkans were either developed in western Anatolia or were transmitted northwards via this region. In particular, ›Impressed Pottery‹ and ›Red Slipped‹ and ›Burnished Ware‹ appear in Southeast Europe alongside the earliest pottery. In western Anatolia, the emergence of these elements can be determined with much more accuracy. Recent research has proved that ›Impressed Pottery‹ emerges in western Anatolia and the Aegean during a relatively restricted time period, i. e. in the final centuries of the 7th millennium cal BC. At the settlement of Ulucak this specific type of decoration is present in ceramic assemblages from Level Va onwards[2]. ›Impressed Pottery‹ appears simultaneously in the eastern Mediterranean, which can evidently be explained by a number of important traits among early farming societies in both these regions[3], including subsistence strategies, elements of material culture and the usage of specific technologies in everyday life. Although the technique of using red-slip on the surface of a vessel is slightly older, it too only occurs in greater frequencies from around this time. The spread of pottery, a central element of the Neolithic Package, into the Balkans can therefore be quite independently dated; initially it can be understood as a part of the cultural history of western Anatolia, as are practically all elements of the Southeast European Neolithic.

In contrast to the Lake District, in western Anatolia painted decoration on vessels appears to be of subordinate importance. On the other hand, in southeastern Europe painted pottery is known from very earliest pottery assemblages, albeit at first in comparatively small amounts. Isolated finds of painted pottery fragments in northwest Anatolia, for example at Çukuriçi[4] and Aktopraklık[5] are very much the exception. This raises the question whether or not these fragments with their white-painted decoration are in fact indicative of contacts in the opposite direction, i. e. from the Balkans to Anatolia. This opens up for the first time an entirely different picture of relationships between these two regions, at the same time raising many new questions. Alas, whereas numerous excavated sites in southeastern Europe are either poorly, or not at all, published, in Anatolia the very small number of excavated sites ultimately presents quite different problems.

From Neolithization to Complex Societies

New excavations in the İzmir hinterland, at the sites of Yeşilova, Ege Gübre, Ulucak and Çukuriçi, all of which are presented in this volume[6], close some of the gaps in the state of the art in Neolithic research in western Anatolia. From the southeastern European perspective these sites are especially interesting as they shed light on the period at the passage from the 7th to the 6th millennium cal BC, a time when Neolithic lifeways began to spread into the Balkans. In Anatolia this horizon is defined as the transition from Late Neolithic to Early Chalcolithic (Fig. 1). However, this is a demarcation which seems arbitrary; at around 6000 cal BC there is absolutely no reason to suspect any significant development which might justify an epochal change[7]. At this time, metal does not yet play the prominent role which it will assume in the course of the 5th millennium cal BC, especially in southeastern Europe. Indeed, and surprisingly, we know very little about the cultural development during this period in Anatolia. Whilst in the 5th millennium cal BC, southeastern Europe, in particular the eastern and central Balkans, emerges as a centre of technological innovation with centralized settlements, highly differentiated burial customs, and a quasi industrial exploitation of important resources such as flint, copper, gold and salt[8], in Anatolia we know of only very few sites from this period[9]. For this reason, it would have been very appealing for us at our meeting to have looked more closely at the relations between Anatolia and the Balkans during the Copper Age; however was not our topic. Nevertheless, the key to understanding the blatantly disproportionate situation in the archaeological record in both regions during this phase must certainly be sought in the cultural development of the preceding 6th millennium cal BC, which of course was the focal point of our conference.

In the last few years, new sites have been discovered in the central Balkans which have not only led to an increase in the number of known sites for the period, but which have also shown us quite clearly that there also exists a completely new type of Neolithic large settlement, for example in the case of Blagotin[10]. Accordingly, the centralization observed among settlements during the southeastern European Copper Age actually began in the Early Neolithic.

1 Mellaart 1970, 115–142.
2 Çilingiroğlu, this volume.
3 Çilingiroğlu 2010.
4 Galik – Horejs, this volume.
5 Karul, this volume.
6 Galik – Horejs; Sağlamtimur; Derin; Çilingiroğlu; all this volume.
7 Schoop 2005, 14–17; Çilingiroğlu 2009, 24–29.
8 Krauß 2010.
9 cf. Schoop 2005, Appendix 1.
10 Jasna Vuković is presenting a use-analysis on the pottery of this site in this volume.

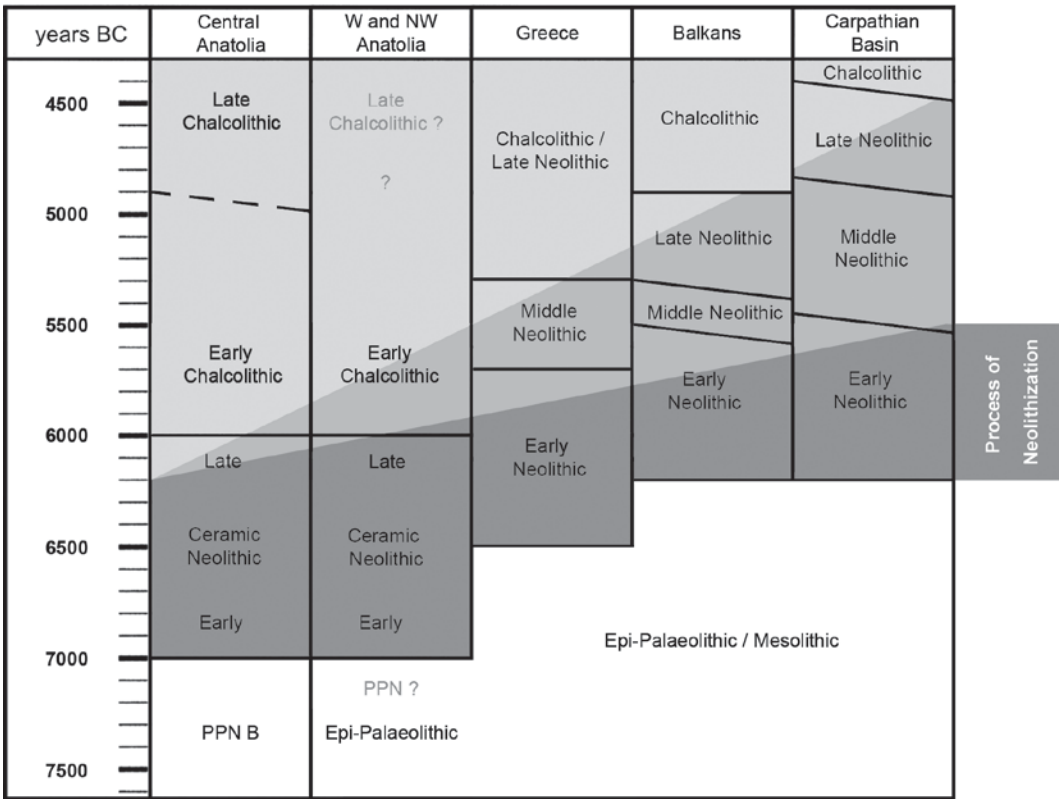

Fig. 1 Chronological chart of the terminology used in Anatolia, SE-Europe and the Carpathian Basin.

The beginnings of such processes can also be discerned for instance at Ilıpınar[11] and on Aktopraklık[12]. For reasons as yet unknown, this development came to a standstill at the close of the 6th millennium cal BC. Although it is unlikely that entire settlement microregions were abandoned at this time, life obviously shifted to other sites in the landscape which are more difficult to detect archaeologically than are the prominent tell sites. Concerning the question as to where the settlements shifted to, survey projects conducted in Drama in southeastern Bulgaria[13] and in Turkish Thrace[14] are of particular significance. Results from Bulgaria show a more or less continuous development from the earliest Neolithic sites to the Copper Age tells. A break in the settlement continuity only becomes noticeable at the end of the 5th millennium cal BC, when most of the settlement mounds that had been occupied over the course of centuries were finally abandoned. Smaller settlements scattered in the river plains or in protected locations at higher altitudes became more common. On the Turkish side, most settlements had already ended by the beginning of the 5th millennium cal BC; however, in this case no conclusions can be reached as to where the emphasis of settlement could have shifted. In this respect, we are far better informed about the inception of settlement processes connected with Neolithization than we are about the processes at the other end of the time scale, i.e. at the transition to the Copper Age (after southeastern European terminology). A prime example is the most significant site in Turkish Thrace, the settlement of Aşağı Pınar, where current excavations have meanwhile reached levels contemporaneous with the initial Neolithization of the Balkans. This important archaeological site is discussed in detail by Eylem Özdoğan and Mehmet Özdoğan in this volume.

Bridgeheads and Barriers in Neolithic Dispersal

The Vardar/Axios river valley in Macedonia is among those regions in Europe which have long held the gaze of Neolithic research, with excavations by colleagues from Skopje at the Tumba Mađari[15] further enhancing our understanding of the Neolithic in this region. These new finds provide the perfect basis for comparisons with the cultural sequence of the Struma valley bordering to the east[16] and the aforementioned new sites in northwestern Anatolia. Due to their geographical situation, running north to south, the river valleys of the Vardar/Axios and Struma are ideal transport routes from the northern Aegean into the Balkans. Hence, they are of immense significance for our comprehension of the cultural development of this entire region, most notably for our understanding of Neolithization processes in the Balkan region (Fig. 2).

Exactly at the transition between southeastern Europe and northwestern Anatolia lies the Marmara area, a region

11 Roodenberg – Thissen 2001.
12 Karul, this volume.
13 Lichardus et al. 2000.
14 Özdoğan 1983a.
15 Kanzurova – Zdravkovski, this volume.
16 cf. Chohadzhiev 2007.

which, should one wish to emphasize the decisive role played by an overland route in the mediation of Neolithic economies, must also be assigned a key function. In the light of research development, this region also looks back on a long history of Neolithic research, prominent excavations having been undertaken at Demircihüyük, near Eskişehir[17], and at the sites of Fikirtepe and Pendik, in the area of modern day İstanbul[18]. Additionally, more recent investigations in

Fig. 2 Location of the major Early Neolithic sites in SE-Europe and Late Neolithic/Early Chalcolithic sites in NW-Anatolia (ca. 6200–5500 cal BC).

17 Seeher 1987.

18 Janse 1925; Bittel 1969; Özdoğan 1983b.

the catchments of the Porsuk and Sakarya rivers, in the vicinity of Lake İznik[19], and in the area to the south of the Sea of Marmara[20] have provided new results. Surprisingly, in contrast to the settlements around İzmir, these sites only offer punctual links to the cultural developments in southeastern Europe. Further, a comparison of archaeological layers using calibrated radiocarbon dates is proving vital to avoid chronological errors which would arise if typological similarities of pottery assemblages alone were considered. The Marmara area shows clear analogies to the development in the İzmir region, through which an indirect parallelization with the Balkan region is possible. Even though recent research has shown that connections can be made, the relatively independent development in the Marmara area shows just how complex relations would have been between the individual regions of western Anatolia and the Balkans. For example, if we consider the dispersal of characteristic Late Neolithic pottery of Toptepe type, outside the Marmara area these types of vessels only occur at a few sites along the Bulgarian Pontic littoral[21]. A circumvention of inland Thrace by Toptepe type pottery in the Late Neolithic is easily discernible; in this area Bulgarian Late Neolithic pottery of Karanovo IV type is exclusive. Potentially, we could be observing a similar situation at the beginning of the Early Neolithic: Earliest (pre-Karanovo I) Neolithic sites have so far only been found either south of the Strandzha, in areas to the north of the ridge of the Balkan Mountains, or west of the Rhodope Mountains.

What Came Before Neolithization?

The lack of finds from the Thracian plains is only one of the problems confronting current research of the Early Neolithic in southeastern Europe. Meanwhile, a reassessment of the absolute ages of sites in the Iron Gates region has served to highlight links between the specialized fishing settlements located at the Danube Gorges, through the Carpathian-Balkan belt, to the Early Neolithic sites in the region. Remarkably however, the Mesolithic sites at the Iron Gates remain the only securley documented evidence for settlement in the region prior to the Neolithic. Although microlithic assemblages have been reported time and again from sites in isolated island locations, for example at the Pobiti Kamăni, near Varna[22], these assemblages are not necessarily of pre-Neolithic age[23]. Occupations in the Palaeolithic caves in the Balkans drew to a close in the Epigravettian at the latest, and currently only very few sites with Epi-Palaeolithic or Mesolithic occupations are known in the Marmara area[24]. This said, the identification of older material is methodologically complicated due to the fact that microlithic industries remained a characteristic feature in Early Neolithic chipped stone repertoires; indeed, this was realized only recently when revised excavation strategies saw greater amounts of excavated sediment sieved, revealing these smaller classes of artefact. Therein lies the biggest problem now facing Neolithic research. Although we are meanwhile relatively well informed about the spread of the Neolithic from northwestern Anatolia to southeastern Europe, we are still lacking information about the milieus into which first farmers and herders subsequently arrived.

As far as the global dispersal of Neolithic lifeways is concerned, past research has seen all potential Neolithization model variants played through at least once; in the case of central Europe there are two prominent and diametrically-opposed theses: diffusionist expansion and autochtonous development. Whereas the former is based on the assumption that Neolithization is the result of the movement of populations into, and the colonization of, previously empty landscapes or areas used by mobile hunter-gatherers, the second model emphasizes continuity of traditions, e. g. as are perhaps evident in chipped stone technologies and in prevailing settlement patterns; these continuities are interpreted as indicative of a local provenance of the new economies, and only cultural impulses are recognized as originating from

◀ 1 Ovčarovo-gorata. 2 Poljanica-platoto. 3 Ovčarovo-platoto. 4 Ovčarovo-zemnika. 5 Zelena Morava. 6 Drinovo. 7 Goljamo Delčevo. 8 Dălgopol-Balkuzu. 9 Medgidia-Cocoaşă. 10 Durankulak-nivata. 11 Malăk Preslavec. 12 Koprivec. 13 Bălgarsko Slivovo. 14 Čakmaktepe. 15 Hotnica. 16 Strelec-Eren bunar. 17 Orlovec. 18 Džuljunica-Smărdeš. 19 Samovodene. 20 Goljamata lisica, Pločite and Smal and Big Cave next to Veliko Tărnovo. 21 Devetaki-Höhle. 22 Krušuna. 23 Gradešnica-Malo pole and -Lukanovo dărvo. 24 Bešovica. 25 Ohoden. 26 Rebărkovo. 27 Zakonica. 28 Banica. 29 Tlačene. 30 Komarevo. 31 Altimir. 32 Devene. 33 Bjala Slatina. 34 Dulceana. 35 Dudeşti. 36 Drâghiceanu. 37 Cîrcea. 38 Grădinile-Islaz. 39 Perieni. 40 Moreşti. 41 Rupea. 42 Valea Lupului. 43 Cipău. 44 Glăvăneşti Vechi. 45 Larga Jijiei. 46 Traian. 47 Balş. 48 Dîrţu-Ceahlău. 49 Trestiana. 50 Suceava-Parcul cetăţii and -Cîmpul Şanţurilor. 51 Probota. 52 Sacarovca. 53 Sokol´cy. 54 Soroki. 55 Ocna Sibiului. 56 Cluj-Gura Baciului. 57 Şeuşa-La cărarea morii. 58 Cauce-Cave. 59 Leţ. 60 Turia-La silozuri. 61 Donja Branjevina. 62 Dubova-Cuina Turcului. 63 Ostrovul Golu. 64 Gornea. 65 Schela Cladovei. 66 Giulvăz. 67 Golokut. 68 Foeni-Sălaş and -Gaz. 69 Dudeştii Vechi. 70 Parţa. 71 Lepenski Vir. 72 Padina. 73 Divostin. 74 Banja Aranđelovac. 75 Ornice-Makrešani. 76 Grivac. 77 Blagotin. 78 Ajmana-Mala Vrbica. 79 Tečić. 80 Bubanj. 81 Crnokalačka bara. 82 Svetozarevo (Jagodina)-Bunar. 83 Vinča-Belo brdo. 84 Pavlovac-Gumnište and -Čukar. 85 Karagač-Žitkovac. 86 Gladnice. 87 Rudnik. 88 Anzabegovo. 89 Vršnik. 90 Govrlevo. 91 Rug Bair. 92 Zelenikovo. 93 Tumba Mađari. 94 Na Breg. 95 Thessaloniki. 96 Thermi. 97 Veluška Tumba and Porodin. 98 Čuka. 99 Radin Dol. 100 Podgorie. 101 Vashtëmi. 102 Barç. 103 Rajc. 104 Dunavec. 105 Slatina. 106 Kremikovci. 107 Čavdar. 108 Čelopeč. 109 Krajnici. 110 Nevestino. 111 Vaksevo. 112 Priboj. 113 Gălăbnik. 114 Pernik. 115 Negovanci. 116 Sapareva banja. 117 Kovačevo. 118 Bălgarčevo. 119 Toumba Serron. 120 Karanovo. 121 Azmak. 122 Stara Zagora-Okrăžna bolnica. 123 Kazanlăk. 124 Ezero. 125 Glufiševo. 126 Veselinovo-Maleva Mogila. 127 Kalojanovec. 128 Mednikarovo. 129 Knjaževo-Rovnište. 130 Lesovo-spring and -Djadopaneva vodenica. 131 Drama-Gerena, -Kajrjaka and -Merdžumekja. 132 Simeonovgrad-Čavdarova češma. 133 Rakitovo. 134 Elešnica. 135 Kapitan Dimitrievo. 136 Dobrinište. 137 Jabălkovo. 138 Krumovgrad. 139 Muldava. 140 Kărdžali. 141 Ljubimec. 142 Hoca Çeşme. 143 Aşağı Pınar. 144 Toptepe. 145 Yarımburgaz. 146 Primorsko. 147 Makri. 148 Fikirtepe. 149 Pendik. 150 Çalca. 151 Musluçeşme. 152 Barcin Hüyük. 153 Ilıpınar. 154 Menteşe. 155 Aktopraklık. 156 Coşkuntepe. 157 Uğurlu. 158 Orman Fidanlığı. 159 Demircihüyük. 160 Ulucak. 161 Ege Gübre. 162 Yeşilova. 163 Dedecik-Heybelitepe. 164 Çukuriçi Höyük.

19 Seeher, this volume.
20 Karul, this volume.
21 Славчев 2008.
22 Gatsov 1989.
23 Krauß 2007.
24 Gatsov – Özdoğan 1994.

areas of earlier Neolithization. Notwithstanding these arguments, the hypothesis of an autochtonous development of the Neolithic is not sustainable for southeastern Europe, if nothing else then because, as already mentioned, Epi-Palaeolithic and Mesolithic occupations are only known from small isolated localities. Thus, it is indeed the case that Neolithization was more likely the result of migration. In fact, this has recently been attested by research conducted by a working group under Joachim Burger, as he himself reported at our meeting. His group has been focusing on the palaeogenetics of the most important animal domesticates, as well as humans. Publications by his co-workers Amelie Scheu on goat domestication and Christina Geörg on domestic pigs are eagerly awaited. Even though there is ever increasing evidence for the spread of agriculture and herding into southeastern Europe via colonization, the dynamics and direction of these processes remains a matter of considerable debate. Following observations by some Turkish colleagues, it would appear that these dispersal processes were by no means constantly intensive and linear but were instead characterized by erratic and specific phases of colonization which were broken by longer phases of consolidation[25]. This type of dispersal is now usually referred to as ›leapfrog colonization‹. In light of the close dependency of the earliest southeastern European Neolithic on cultural developments in western Anatolia, one might consider whether initial Neolithization was triggered by an abrupt event, perhaps in the context of dramatic climate change. The evaluation of chronologically high-resolution climate data and studies of potential rapid climate change impacts upon human culture is a topic currently being studied by Bernhard Weninger and Lee Clare. More specifically, in their contribution to this volume they look at evidence for a climatic event in the centuries around 6200 cal BC and its potential consequences for cultural development in northwestern Anatolia and southeastern Europe.

The İstanbul Workshop in April 2009

The idea for this conference was born in a kitchen in Berlin in February 2009 together with Mehmet Bey and Eylem Özdoğan, and was finally realized in conjunction with Barbara Horejs from the Austrian Archaeological Institute and Dan Ciobotaru from the Museum of the Banat in Timişoara. This close collaboration, already in the planning phase, is soundly attested by the broad geographical and institutional frame of the meeting, which spanned from the Austrian excavations in Ephesos to the eastern reaches of the Carpathian Basin. All three organizers were, and still are, closely connected by their common interest in Neolithic research, though with their respective foci in western Anatolia, the Balkans and the Banat. The workshop was held at the German Archaeological Institute in İstanbul from 8th to the 9th April 2009, where we received a very cordial welcome from the first director, Felix Pirson.

To a certain extent this workshop continued the tradition of earlier conferences held at the Institute in İstanbul which began in 2004 with a meeting organized by Clemens Lichter dedicated to the question »How did farming reach Europe?« The focus of this first meeting was the spread of farming and herding from Asia Minor to Greece. Meanwhile, this primary dispersal route of Neolithic lifeways has been the subject of monographs which have focused on both sides of the Aegean, respectively[26]. The focus of our conference was in so far supplementary in that it instead looked at the expansion of Neolithic innovations in a northwesterly direction from Asia Minor towards central Europe.

Participants at the workshop were: R. Becks (İstanbul), D. Borić (Cambridge/Cardiff), J. Burger (Mainz), Ç. Çilingiroğlu (Tübingen/İzmir), D. Ciobotaru (Timişoara), Z. Derin (İzmir), N. Elenski (Veliko Tărnovo), N. Evstratiou (Thessaloniki), B. Horejs (Wien), N. Karul (İstanbul), R. Krauß (Tübingen), C. Lichter (Karlsruhe), E. Özdoğan (İstanbul), M. Özdoğan (İstanbul), A. Reingruber (Berlin), H. Sağlamtimur (İzmir), J. Seeher (İstanbul), A. Seeher (İstanbul), A. Scheu (Mainz), Ch. Rütze (now Geörg, Mainz), J. Vuković (Belgrade), B. Weninger (Köln), and temporarily a number of students of the İstanbul University.

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25 Zvelebil 2001; Özdoğan 2010; also M. Özdoğan and Çilingiroğlu, this volume.

26 Schoop 2005; Reingruber 2008.

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The Framework

Holocene Rapid Climate Change in the Eastern Mediterranean. An Emerging Archaeological Climate Research Programme

by Bernhard Weninger – Lee Clare

Abstract

In this paper we review the impact of Holocene Rapid Climate Change (RCC), as defined by Mayewski et al.[1] and Rohling et al.[2], on prehistoric communities in the eastern Mediterranean. Following an introduction to the RCC mechanism, we assemble an up-to-date selection of recently published palaeoclimate records (terrestrial, marine, and stalagmite) from the region. These records together provide significant evidence for the occurrence of a series of quasi-cyclic Holocene RCC conditions. In combination with high-resolution Greenland GISP2 ice-core glaciochemical records, the available set of marine and environmental data allow an accurate (decadel scale) forecasting of expected dates for the most extreme Holocene RCC-conditions in the eastern Mediterranean basin. Based on a set of delimited ages for RCC, we propose a climatic background for the following archaeological processes and events: (1) the end of the Aegean Bronze Age at 3.0 ka cal BP, (2) the collapse of the SE-European Copper Age at 6.2 ka cal BP, and (3) the abandonment of Catalhöyük-East at 8.2 ka cal BP. Finally, we show that the Early Chalcolithic site of Ulucak on the western Turkish coast[3] was first inhabited at the onset of the 8.6–8.0 ka cal BP RCC cold period. This supports previous proposals[4] that the processes associated with the spread of early farming from central Anatolia to the Balkan Peninsula may also have had a significant climate component.

Introduction

Contemporary studies of past climates have demonstrated the existence of large natural variability in many important climatic and metereorological parameters (e. g. air temperature, snow accumulation, precipitation rates, atmospheric circulation patterns, oceanic circulation, seasonality) both on global and on regional scales. The magnitude and extreme rapidity with which past climates have changed is quite remarkable. One of the most significant discoveries of recent palaeoclimate research is the existence of a distinctly repetitive series of cooling anomalies during the Holocene. In the GISP2 chemical ion record these severe cooling events are seen to run systematically through the Last Glacial into the Holocene and up to modern times. Following Mayewski et al.[5], and Rohling et al.[6], these cold anomalies are termed »Rapid Climate Change« (RCC) events. The most recent of these anomalies is known as the ›Little Ice Age‹ (LIA; ca. 1550–1929 AD).

Introduction to Rapid Climate Change (RCC)

The existence of rapid fluctuations in Northern Hemispheric Glacial atmospheric circulation patterns was first recognised some 12 years ago, based on detailled analysis of the GISP2 glaciochemical record[7]. As a result of these studies it became clear that the cooling anomalies, both during the Glacial and Holocene, were synchronous with high concentrations of certain ions (e. g. marine-derived sodium [Na^+] and terrestrial potassium [K^+])[8]. Subsequent studies, based on comparisons between GISP2-ion records and modern meteorological data, demonstrated that high GISP2 Na^+ and non-sea-salt (nss) K^+ concentrations are related to the quasi-cyclic expansion and intensification of the Siberian High[9]. These studies showed further that during the LIA in the Northern Hemisphere, and especially during winter months (December/January/February), the Siberian High, the Icelandic Low and the Azores High were all of a much higher intensity than during the Medieval Warm Period (MWP). One of the main causes of the LIA, in addition to solar intensity weakening, therefore appears to have been a strengthening of the atmospheric pressure gradients between Siberia (High), Iceland (Low) and the Azores (High). Such conditions support the influx of extremely cold air from the polar regions into Europe.

Further comparisons of the GISP2 glaciochemical record with terrestrial and marine records on a global scale showed the existence of six intervals during the Holocene with dis-

1 Mayewski et al. 1997; Mayewski et al. 2004.
2 Rohling et al. 2002.
3 Çilingiroğlu 2009.
4 Weninger et al. 2006; Weninger et al. 2009; Clare et al. 2008.
5 Mayewski et al. 2004.
6 Rohling et al. 2002.
7 Mayewski et al. 1997.
8 Mayewski et al. 1997.
9 Meeker – Mayewski 2002.

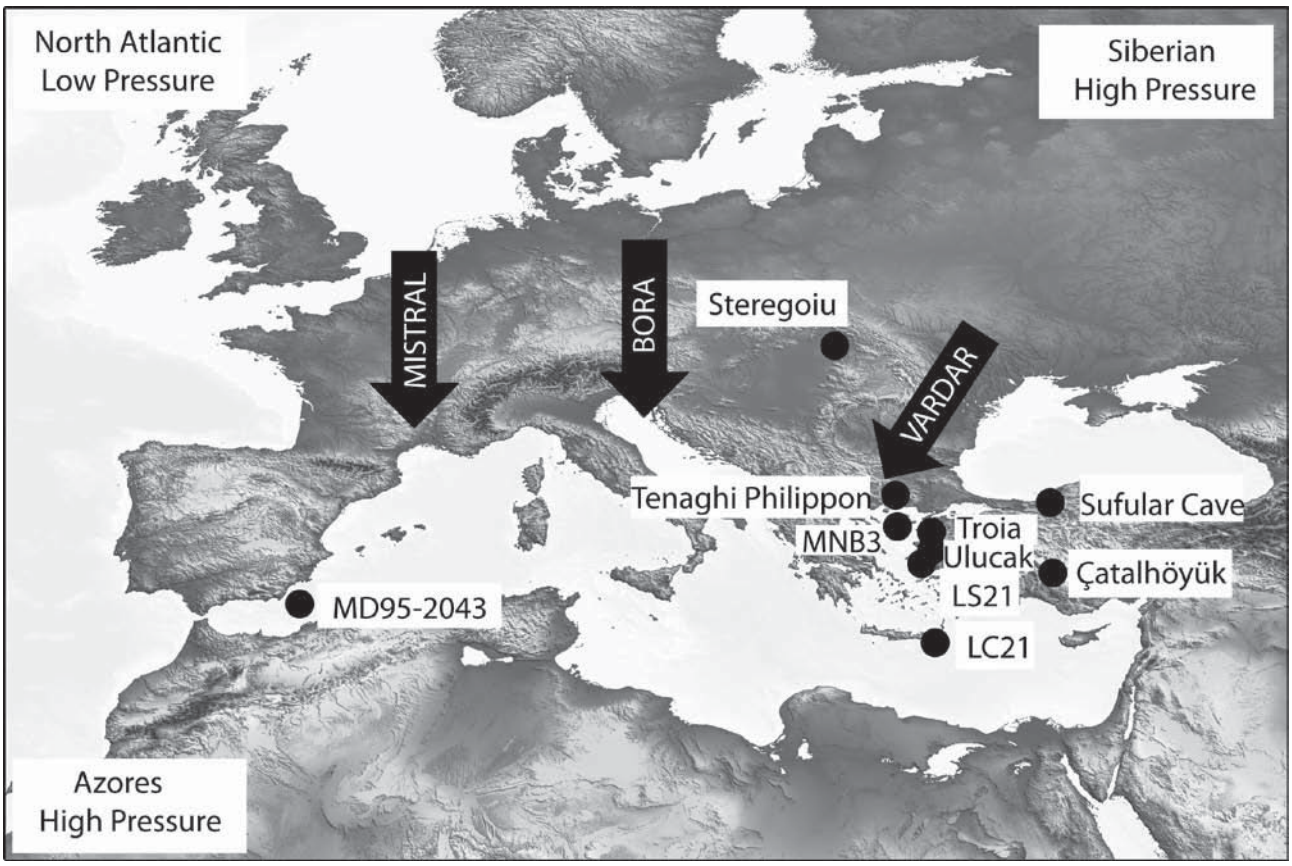

Fig. 1 Map showing locations of RCC-study sites and important RCC-winds. SRTM (Space Shuttle Radar Mission, 2002), Elevation Data (Becker et al. 2009).

tinct cooling anomalies[10]. The dates attributed to these intervals are: 9000–8000, 6000–5000, 4200–3800, 3500–2500, 1200–1000, and 600–150 cal BP. Again, the most recent of these RCC intervals corresponds to the LIA. The extent of global cooling that occurred during these intervals is evident in widespread glacial advances in both hemispheres, and in a strengthening of westerlies over the North Atlantic and Europe.

In Fig. 2 and Fig. 3 we provide an up-to-date assemblage of climate records from the eastern Mediterranean that show RCC-cooling. The site locations for these records are shown in Fig. 1.

Rapid Climate Change (RCC) in the Eastern Mediterranean

In the eastern Mediterranean, RCC periods are characterised by an additional mechanism that was first identified by a strong correlation between Greenland GISP2 terrestrial [K^+] values and significant sea-surface temperature (SST) fluctuations in the eastern Aegean (core LC21; 35.66 °N, 26.48 °W, –1522 m water depth)[11]. The location of marine core LC21 close to Crete (Fig. 1) not only makes it particularly sensitive to the expansion and contraction of cooler northern Aegean waters, but also means that it is in a perfect position to register the cooling effects of winds sweeping down from the Balkans. As shown in Fig. 2, marine core LC21 shows three major cooling events (around 8.2, 6.2, and 3.0 ka cal BP), which are causally related (as known from detailed seasonal studies of the marine fauna[12]), by extremely cold and dry air masses flowing in rapidly from the Balkans. Significantly, in order to reach the LC21 core location, the north-easterly (RCC) winds must traverse the Aegean Sea over a distance of some 700 km. The ability of the cold north-easterly winds to induce so much cooling in the LC21 water column (~ 300 m) in such a short time (max ~ 100 yrs) during RCC periods attests to the remarkable intensity of the underlying cold polar/continental airflows. This cooling is all the more remarkable since the cold air influx typically occurs only for a brief time each year, i. e. some few days or weeks during winter and early spring.

Upwind across the Russian plains, some clearly correlated cold and strong winds, are documented by major peaks in the chemical ions (e. g. potassium [K^+]) that were blown in from the wide plains of eastern Asia (north of the Himalayas) onto the Greenland ice-sheet[13]. The different geographical

10 Mayewski et al. 2004.
11 Rohling et al. 2002.
12 Rohling et al. 2002.
13 Mayewski et al. 1997 with further references.

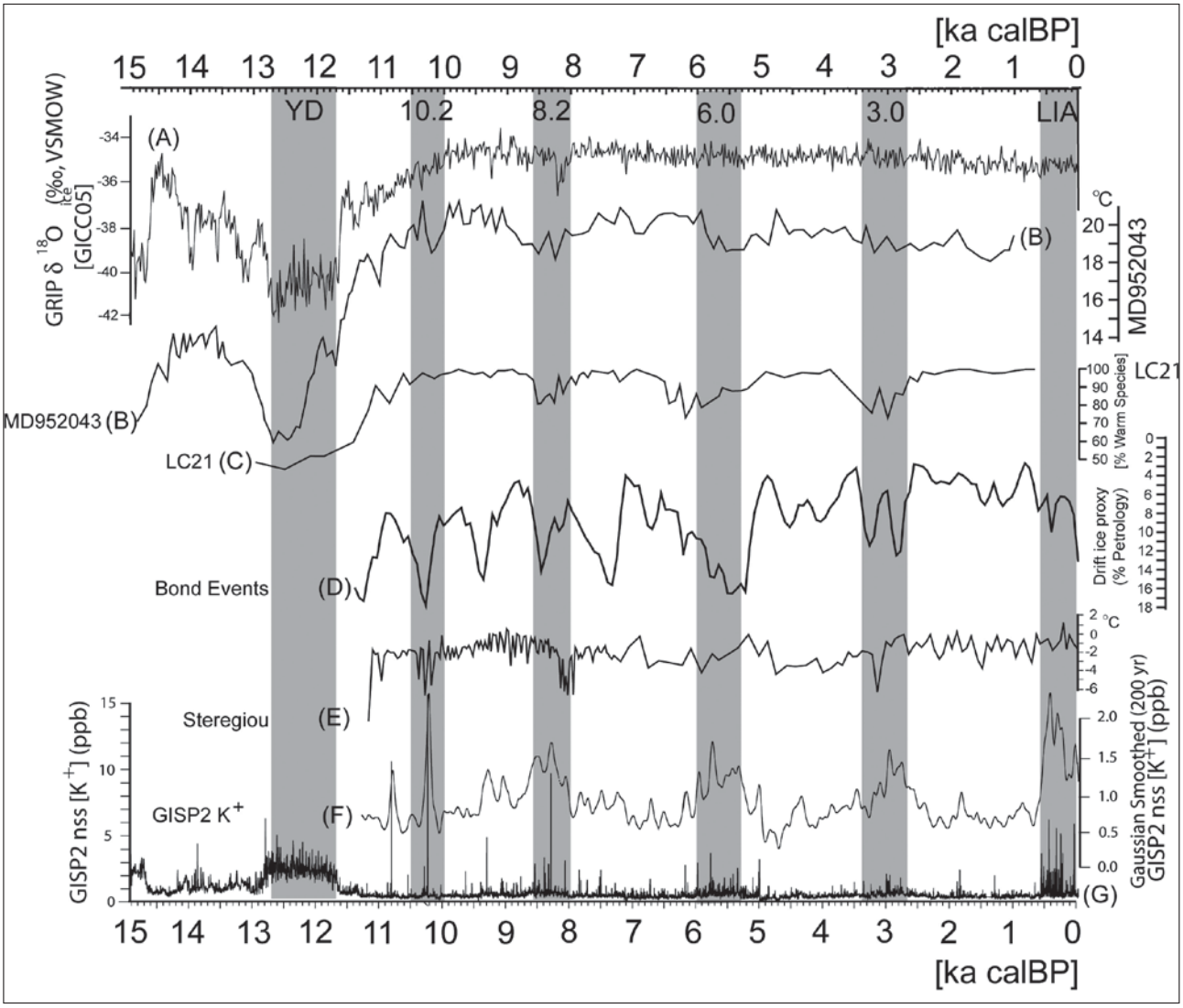

Fig. 2 First Set of Northern Hemisphere Palaeoclimate Records showing Holocene Rapid Climate Change (RCC) (for locations cf. Fig. 1), (A) GRIP ice-core $\delta^{18}O$ as proxy for air-temperature over Greenland (Grootes et al. 1993), (B) Western Mediterranean (Iberian Margin) core MD95–2043; C37 alkenones as proxy for sea surface temperature (SST), Cacho et al. 2001; Fletcher – Sánchez Goñi 2008, (C) Eastern Mediterranean core LC21, marine fauna as proxy for SST-variations (seasonal: winter/spring); Rohling et al. 2002, (D) North Atlantic Bond-Events, stacked petrologic tracers of drift ice from cores MC52-V29191+MC21-GGC22, Bond et al. 1997, (E) Romania (Steregoiu), Peat vegetation pollen relations as proxy for Mean Annual Temperature of the Coldest Month (MTC, °C), Feurdean et al. 2008, (F) Gaussian smoothed (200 yr) GISP2 potassium (non-sea salt [K^+]) as proxy for the Siberian High (Mayewski et al. 1997; Meeker – Mayewski 2002), (G) High-Resolution GISP2 potassium (non-sea salt [K^+]) as proxy for the Siberian High (Mayewski et al. 1997; Meeker – Mayewski 2002).

corridors from Siberia to the Mediterranean, along which these intensively cold air masses sweep in during RCC periods, are indicated by arrows in Fig. 1. Today, these winds are known as the Mistral, Bora and Vardar, depending upon where they enter the Mediterrranean basin. Consequently, it appears that during RCC periods the eastern Mediterranean was regularly bathed in some of the coldest air masses to be found anywhere on the globe.

The present basic understanding of the RCC mechanism is that the same meteorological conditions were at work not only during the Holocene RCC periods but also many times during the Glacial. Of further importance for archaeological research is the emerging multiple confirmation of the reality of the RCC mechanism and its quite unexpected strength, as documented in a rapidly increasing number of palaeoclimatic records from the different geo-biospheric realms (marine, terrestrial, stalagmite, ice core).

For purposes of archaeological studies on the societal impact of the RCC mechanism, we have derived a set of shortened (delimited) RCC time intervals. For these delimited RCC intervals we provide dates of 8600–8000 ka, 6000–5200 ka cal BP, and 3000–2900 cal BP[14]. The idea underlying this definition of age-delimited RCC periods is to identify those time sections of the Holocene for which the strongest impact of RCC conditions on prehistoric societies may be expected.

14 Weninger et al. 2009.

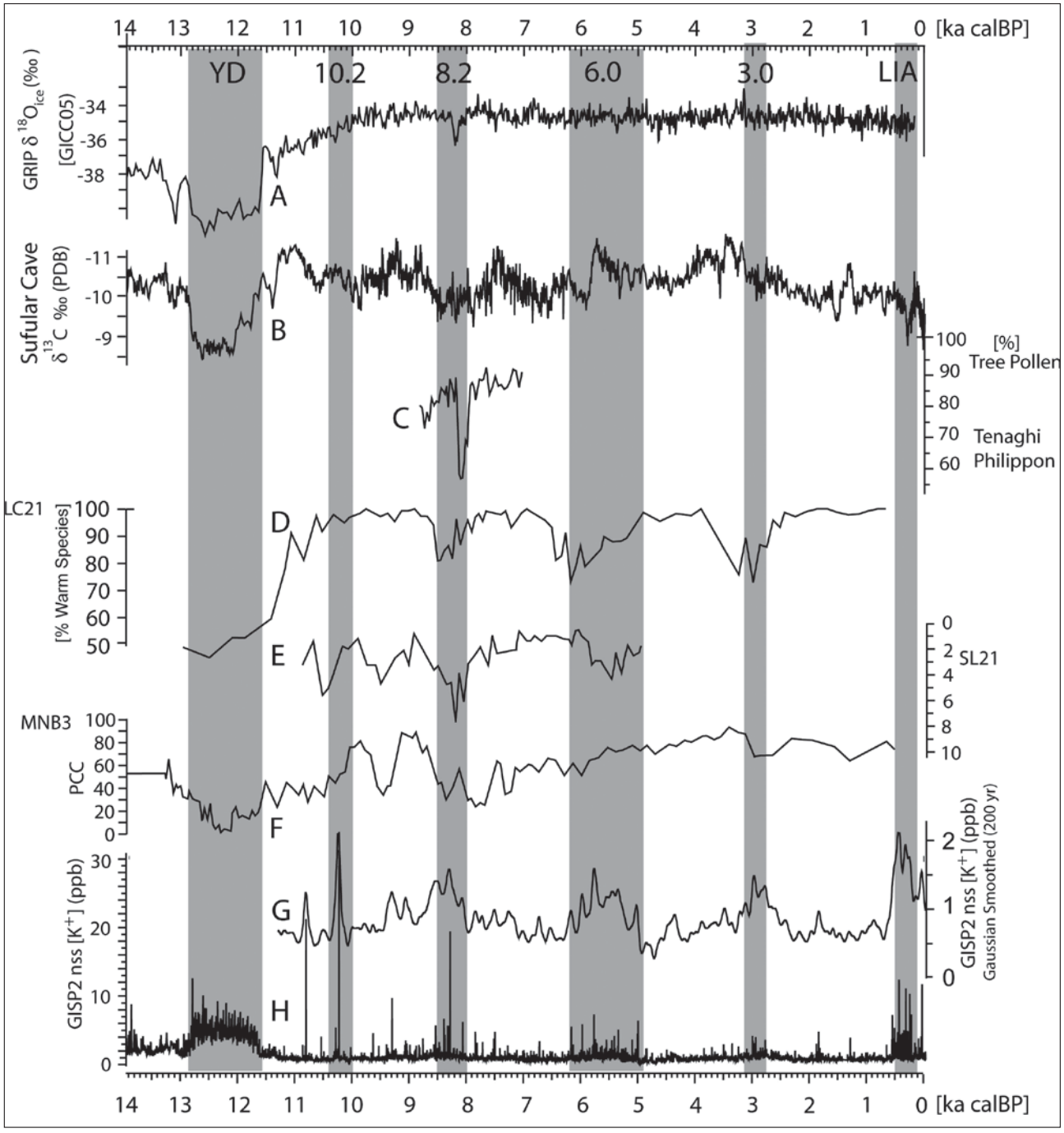

Fig. 3 Second Set of Northern Hemisphere Palaeoclimate Records showing Holocene Rapid Climate Change (RCC) (for locations cf. Fig. 1), (A) GRIP ice-core $\delta^{18}O$ as proxy for air-temperature over Greenland (Grootes et al. 1993), (B) Sufular Cave $\delta^{13}C$ as proxy for tree/steppe vegetation (Fleitmann et al. 2009), (C) Tenaghi Philippon Tree Pollen as proxy for tree/non-tree vegetation Pross et al. 2009), (D Eastern Mediterranean core LC21, marine fauna as proxy for SST-variations (seasonal: winter/spring); Rohling et al. 2002 (E) Eastern Aegean core SL21, marine fauna as proxy for SST-variations (seasonal: winter/spring); Marino et al. 2009, (F) Northern Aegean Core MNB3, PCC = Planktonic Climate Curve as proxy for SST-variations (Geraga et al. 2010), (G) Gaussian smoothed (200 yr) GISP2 nss $[K^+]$ as proxy for the Siberian High (Mayewski et al. 1997; Meeker – Mayewski 2002), (H) High-Resolution GISP2 nss $[K^+]$ as proxy for the Siberian High (Mayewski et al. 1997; Meeker – Mayewski 2002).

Geographic RCC Corridor

Due to the availability of modern meteorological analogues for the RCC mechanism, we have also been able to identify some specific geographic regions in the eastern Mediterranean for which the strongest RCC impact may be expected. These regions are situated along the ›RCC corridor‹ which runs from Ukraine, through southeastern Europe, into the Aegean and also across large parts of Anatolia (Fig. 1). Consequently, we now know specifically both *where* and *when* to look in the Holocene archaeological record in our search for potential societal RCC impact.

Age-Delimited RCC Periods

Due to the complex structure of the GISP2 nss $[K^+]$ record (Fig. 2), we would be ill-advised to assume that each of the observable (quasi-annual scale) $[K^+]$ peaks in the GISP2-

record resulted in observable societal impacts. Rather, we propose that it is useful to focus on those portions of the GISP2 [K^+] record for which an extended sequence of unusually high [K^+] values can be observed. Many of the intervals with high [K^+] values also show high values in the other chemical ions (e.g. [Na^+] and [Cl^-]), which often react »in concert« with one another, to use the terminology of Mayewski et al.[15]. For archaeological purposes, therefore, we identify the ›strongest‹ RCC periods by the simultaneous occurrence of enhanced values in the different, but complementary, GISP2 glaciochemical records, with the focus on [K^+], [Na^+], and [Cl^-]. By this method, the likelihood of encountering periods in which RCC impact is discernible in the archaeological record is much increased. The application of this method is illustrated for the 3.0 ka RCC period in Fig. 4. The following archaeological case studies provide examples of this delimiting method which embraces the establishment of precise RCC time intervals and their comparison with archaeological site-chronologies.

As shown in Fig. 4 in high-resolution for the 3.0 ka cal BP RCC interval, the GISP2 time series for terrestrial [K^+], marine [Na^+] and marine [Cl^-] all show remarkably high peaks centred on the decade ~2990 cal BP_{GISP2} (1040 cal BC_{GISP2}). In detail, at 1040 cal BP_{GISP2} the [Cl^-] record shows one of its highest peaks anywhere during the last 50.000 yrs. The [Na^+] record also shows high peaks around the same time, and the [K^+] record reveals continuously high values from 2990–2030 cal BP_{GISP2} (1040–980 cal BC_{GISP2}). Significantly, an extreme and abrupt drop in SST of ~2 °C is observed at the same time during winter/spring in the northern Aegean Sea SST (cores MNB3 and SL21: Fig. 3F, E). Furthermore, icebergs are documented in the North Atlantic (Fig. 2D: Bond events). Finally, an extreme drop of 4 °C may be observed at Steregiou (Romania) in the pollen-based reconstruction of seasonal (again: winter/spring) air temperature. The GISP2-derived age-values for this specific RCC are therefore supported by independent (marine and terrestrial) evidence, in spite of the generally much lower dating precision of these records.

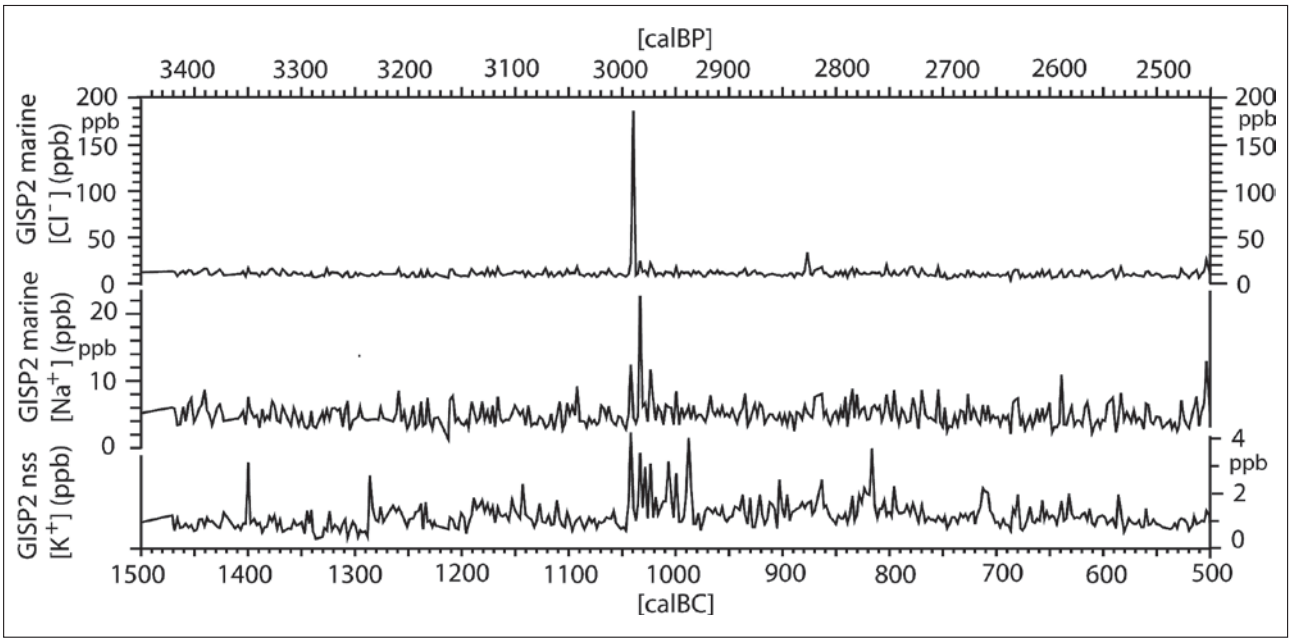

Fig. 4 GISP2 chemical ion records in the time window 3400–2500 cal BP_{GISP2} (1500–500 cal BC_{GISP2}). Upper: Marine-source [Cl^+] as proxy for the strength of North Atlantic storminess; Middle: Marinel-source [Na^+] as proxy for the strength of the Icelandic Low; Lower: Terrestrial-source nss [Na^+] as proxy for the strength of the Siberian High. Data from Mayewski et al. (1997). Interpretation (cf. text) according to Meeker – Mayewski (2002).

Archaeological RCC studies

Troia: (Northwest Anatolia): 3.0 ka cal BP RCC Period

On the broader scale of ~3.5–2.5 ka cal BP, the RCC interval as defined by Mayewski et al.[16] coincides with such an enormous set of cultural events in the Eastern Mediterranean that we are well advised to begin the RCC discussion by listing the archaeological topics *not* to be taken into consideration. These include the quasi-simultaneous destruction ~3150 cal BP (1200 hist BC) of all major Mycenaean palaces, the collapse of the Hittite Empire in central Anatolia, a high frequency of sacked and burned towns in Cyprus and the Levant, as well as large amounts of good archaeological and historical documentation for violent raids and other atrocities on land and by sea throughout the eastern Mediterranean.

15 Mayewski et al. 1997.

16 Mayewski et al. 2004.

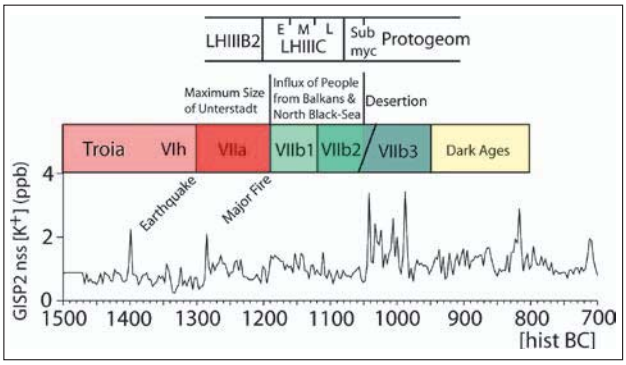

Fig. 5 Upper: Architectural Periodisation of Troia (Korfmann 2006). The definition of a new phase (Troia VIIb$_3$) at the end Troia VII is subject of ongoing research (see text). Lower: Greenland GISP2 ice-core nss [K$^+$] chemical series (Mayewski et al. 1997). Adapted from Weninger et al. (2009).

Indeed, as shown by comparing Fig. 4 (climate data) with Fig. 5 (Upper: Aegean Late Bronze Age periodisation), these extreme societal events occur well over 100 years prior to the maximum GISP2 nss [K$^+$] signal, which dates between 1040 to 980 cal BC$_{GISP2}$. In search of any societal impact of the 3.0 ka cal BP RCC, we are immediately led to the site of Troia which has a central position within the geographic RCC corridor (Fig. 1). With strong winds blowing in from the northeast essentially all year round[17], the Trojans could exert control over all shipping passing between the Mediterranean and the Black Sea. Ships would be forced to take harbour at Besik Bay, just a few kilometres west of Troia; indeed, some would have been dragged over land to be returned to water in the Dardanelles, a few kilometres north of Troia. It is this superb geo-strategic position of Troia that might explain the unusual wealth of its inhabitants throughout its many cultural phases and periods. Previously[18], we proposed that the location of Troia, with its climatically sensitive position within the RCC corridor, may ultimately have led to its downfall at the end of the Bronze Age.

The age-delimiting method now provides us with chronological guidance on where to look in Troia for the RCC effects. As shown in Fig. 4, the superposition of the site chronology[19] and the GISP2 nss [K+] record[20] – and both chronologies have a precision of a few decades older or younger – indicates that (1) either the site was abandoned at the onset of the RCC around 1040 cal BC$_{GISP2}$, or (2) the site was still (if only briefly) occupied, in which case the RCC years would correlate with one of its final phases of occupation (VIIb2/3).

Now, what complicates the RCC question at Troia is the near-complete destruction of the latest (Troia VIIb2/3) Bronze Age architecture. This is the result of major building activities during the Hellenistic and Roman periods[21]. However, in spite of the inherent analytical difficulties owing to such large-scale destruction of RCC-relevant architecture, the excavator Manfred Korfmann supplies significant arguments in support of site abandonment that would date, with decadel precision, just within the 3.0 ka cal BP RCC study period.

Korfmann's two main arguments for site abandonment at the end of Troy VIIb are: (1) that the deep cistern well in the northeast of the Citadel was abandoned at the latest during Troia VIIb$_2$, thus marking the end of the central water supply for the privileged classes living within the Citadel, and (2) that in square D9 a layer of eroded limestone indicates that the major fortfication wall would have been open to decay after this time[22]. He concludes that, »at the very latest from c. 1000/950 BC, there was no more settlement in Troia worthy of the name«[23].

Although these processes warrant further investigation, the temporal coincidence of the desertion of the Troia site with a major RCC period already provides clear indications that the chronological hiatus at Troia between periods VIIb (Late Bronze Age) and VIII (Archaic) may have been triggered by RCC-induced climate deterioration.

Southeast Europe: 6.0–5.2 ka cal BP RCC Period

In our second archaeological RCC study we turn to the Copper Age in southeastern Europe. What we observe in the period prior to the onset of RCC conditions around 6000 cal BP are geographically extensive trade networks that reach from the coast of the Black Sea all the way into Central Europe. The multi-layer tell sites supported a clearly well-organized society, with food supplies based on a mixed agrarian/herding/hunting economy, as well as marine and river fishing. Around 6000 cal BP, a sudden and clearly widespread (supra-regional) abandonment of the sometimes huge (up to 20 m high) Copper Age multi-layer tell sites occurs, and for the following ~800 years we observe a temporary switch to the occupation of smaller (unfortunately largely unexcavated) mono-layer sites, as well as to caves in upland locations[24]. Occupation of these sites is on a significantly lower demographic scale compared with the densely populated tells; this is thought to represent a more mobile, pastoralist economy[25].

Naturally, such drastic socio-economic switches call for some equally dramatic explanation. Perhaps the most drastic explanation for the Copper Age collapse is given by Todorova[26]. Her explanation reads very much like a »textbook study«[27] on climatic/environmental determinism: »The brilliant development of the Late Eneolithic cultural block was terminated at the end of the fifth and the beginning of the fourth millennium B.C. […] by a colossal, global and multicausal environmental catastrophe [p. 89]. […] The catastrophe was of colossal scope as seen from changes in the settlement density which by the late Eneolithic included more than 600 settlements. By the start of the Transitional Period not a single site is known. It was a complete cultural caesura [p. 90]«[28].

On the basis of these observations – (1) widespread Copper Age system collapse in southeastern Europe around

17 For monthly details cf. Korfmann 2006.
18 Weninger et al. 2009.
19 Korfmann 2006.
20 Mayewski et al. 1997.
21 Blegen et al. 1958, 247.
22 Korfmann 2002.
23 Korfmann 2002, 215.
24 Perlès 2001.
25 Perlès 2001.
26 Todorova 1995.
27 Bailey et al. 1995.
28 Todorova 1995.

6000 cal BP, (2) evidence of widespread social conflict, (3) evidence of synchronous major societal changes in the following millenium, and (4) the synchronicity of these processes with one of the strongest and most extended RCC periods of the Holocene – we propose that the RCC-mechanism provides a viable explanation for the observed societal trajectories[29].

Çatalhöyük (Central Anatolia)

In our further search of potential impacts of the RCC mechanism, we now turn to the Neolithic in central Anatolia. Indeed, in earlier publications we already proposed that the societal and environmental impact of the 8.2 ka cal BP Hudson Bay event, when superimposed upon the 8.6–8.0 ka cal BP RCC period, provides a viable explanation for the apparent abrupt desertion of Çatalhöyük-East[30]. Çatalhöyük-East is one of the largest multilayer tell settlements known from anywhere in the eastern Mediterranean. The site is actually comprised of two large settlement mounds – an eastern and a western mound. The East mound was first settled in the mid-10th millennium cal BP, after which it experienced a long (~1500 yr) period of continuous occupation. For reasons presently unknown in detail, Çatalhöyük-East appears to have been abandoned at ~8.2 ka cal BP (Fig. 6, Lower). Then, following a gap of some 200 years, the neighbouring western mound was founded (Fig. 6, Upper), at least according to presently available radiocarbon ages. Indeed, we are aware that archaeological evidence is beginning to emerge for a degree of continuity between the two mounds; nevertheless, the associated change in settlement location must also reflect significant transitional processes that were at work at this time. Remarkably, the settlement gap of 200 years in the Konya plain does not correspond exactly to the 8.6–8.0 ka cal BP RCC, but rather to the second half of this time interval, i.e. at a time when the RCC mechanism is further amplified by the 8.2 ka cal BP Hudson Bay event[31].

According to Barber et al.[32], around 8.2 ka cal BP a large remaining ice block in North America that separated the proglacial Lake Agassiz from the North Atlantic collapsed, whereby large amounts of glacial meltwater were abruptly released into the sub-arctic ocean. Ocean circulation studies[33] show that the amount of melt-water injected from Lake Agassiz into the North Atlantic at this time would have been capable of temporarily disrupting the entire northward oceanic heat flow. As shown by Thomas et al.[34], this cooling is limited to some 200 years, during which the North Atlantic circulation slowly recovered. Around 8000 cal BP, the deep water circulation reached its original strength and large amounts of warm water were again transported from Equatorial regions into the North Atlantic.

What complicates matters is that many of the severe climatic effects initially attributed to the 8.2 ka cal BP Hudson Bay event may actually have been caused by the coincident 8.6–8.0 ka cal BP RCC conditions[35]. The present state of discussion is that the two mechanisms are not only temporally superimposed, but are also likely to have amplified each other other[36]. Most recently, Marino et al.[37] note that the Hudson Bay outflow is likely to have had consequences well beyond

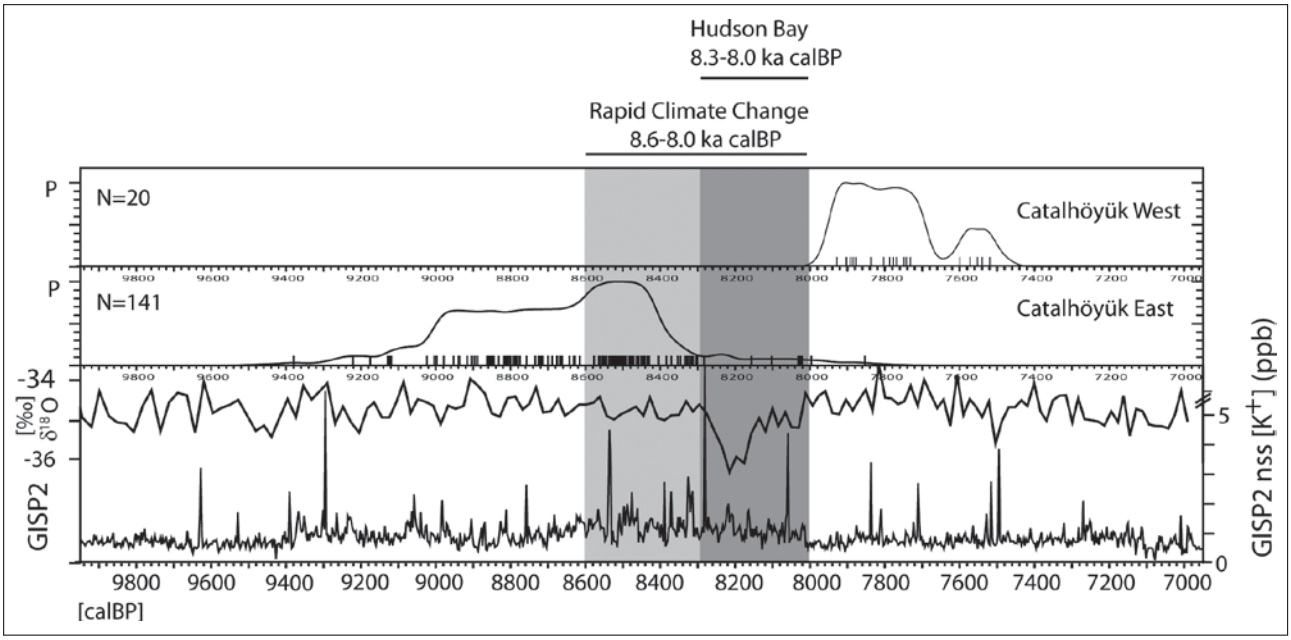

Fig. 6 Radiocarbon Dates from Çatalhöyük (Central Anatolia) in comparison to selected climate records. Upper: ^{14}C-Data from Çatalhöyük West (N = 20) and from Çatalhöyük East (N = 141) (cf. Appendix I, Radiocarbon Database). Lower: Greenland GISP2 ice-core δ^{18}O (Grootes et al. 1993); GISP2 potassium (terrestrial [K^+]) ion proxy for the Siberian High (Mayewski et al. 1997; Meeker –Mayewski 2002).

29 Weninger et al. 2009.
30 Weninger et al. 2006; Weninger et al. 2009; Clare et al. 2008.
31 cf. Barber et al. 1999; Rohling – Pälike 2005; Thomas et al. 2007.
32 Barber et al. 1999.
33 e.g. Bauer et al. 2004.
34 Thomas et al. 2007.
35 Rohling – Pälike 2005.
36 Rohling – Pälike 2005; Pross et al. 2009.
37 Marino et al. 2009.

the North Atlantic region, where a strengthening of the cold westerly winds is to be expected.

Interestingly, around 8600 cal BP, i.e. some 400 years prior to the 8.2 ka cal BP Hudson Bay outflow, there is an initial major dispersal of early farming communities out of Central Anatolia (»Go West«[38]). These communities first appear (according to available ^{14}C-data), in the Turkish Lake District, but quasi-simultanously (within ^{14}C-dating errors) along the western coastline of Turkey. This dispersal continues westwards across the Aegean into Greece, and at around the same time earliest farming communities are observed in southeastern Europe.

Ulucak (Turkish West Coast)

As shown in Fig. 7, the Early Chalcolithic (Anatolian Terminology) site of Ulucak on the Turkish west coast[39] was first inhabited (as presently known) in phase VIa, around 6600–6500 cal BC. This is in extremely close temporal proximity to the onset of the 8.6.–8.0 ka cal BP RCC. Additionally,

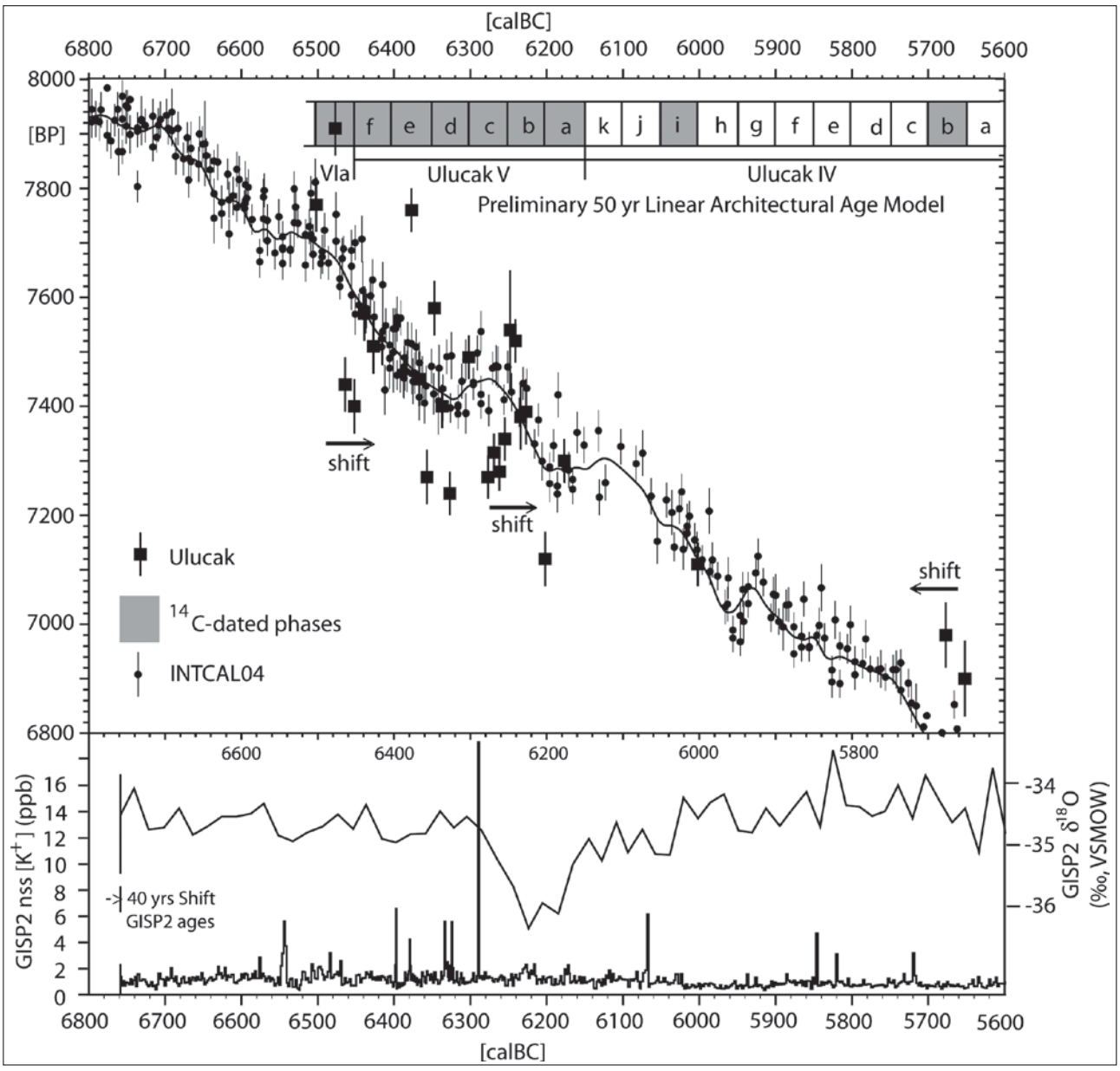

Fig. 7 Upper: Preliminary Linear Stratigraphic ^{14}C-Age Model (Tab. 1) for Ulucak (Levels VIa – V – IV), based on average 50 yrs phase length, in comparison to INTCAL09 calibration curve (thin line; Reimer et al. 2009) and INTCAL09 raw data (bar length ± 1 σ). Lower: Greenland GISP2 ice-core δ^{18}O (Grootes et al. 1993), GISP2 nss [K^+] (Mayewski et al. 1997). GISP2-ages are shifted 40 yrs younger than published (Grootes et al. 1993), according to Weninger et al. (2006) in agreement with the new (recounted) Greenland ice-core GICC05 age model (Vinther et al. 2006). Interpretation: Ulucak is continuously occupied through all Phases VIa – Va (Çilingiroğlu (2009) but only shaded phases are presently ^{14}C-dated. Expected age-shifts are indicated by arrows. It is likely that all Ulucak level IV-phases will ultimately have shorter than 50 yr phase-length and will date older than indicated (cf. text).

38 Özdoğan 2002.

39 Çilingiroğlu 2009.

Lab – Code	Material	^{14}C-Age [BP]	Ulucak Phase	Delta [a]	Sum [a]	Result [calBC]	Result [calBP]
undated	–	–	IVa	–	–		
Beta-178748	charcoal	6900 ± 70	IVb	0	0	5652	7602
Beta-178747	charcoal	6980 ± 60	IVb	25	25	5677	7627
undated	–	–	IVc	25	50	–	–
undated	–	–	IVd	50	100	–	–
undated	–	–	IVe	50	150	–	–
undated	–	–	IVf	50	200	–	–
undated	–	–	IVg	50	250	–	–
undated	–	–	IVh	50	300	–	–
Beta-188371	charcoal	7110 ± 40	IVi	50	350	6002	7952
undated	–	–	IVj	50	400	–	–
undated	–	–	IVk	50	450	–	–
Beta-188372	charcoal	7300 ± 40	Va	50	500	6177	8127
Beta-188370	charcoal	7120 ± 50	Va	25	525	6202	8152
Beta-212085	charcoal	7390 ± 60	Vb	25	550	6227	8177
Beta-212086	charcoal	7380 ± 60	Vb	7	557	6234	8184
Beta-212087	charcoal	7520 ± 40	Vb	7	564	6241	8191
Beta-223540	charcoal	7540 ± 110	Vb	7	571	6248	8198
KN-5782	charcoal	7340 ± 40	Vb	7	578	6255	8205
KN-5781	charcoal	7280 ± 35	Vb	7	585	6262	8212
KN-5783	charcoal	7315 ± 35	Vb	7	592	6269	8219
Beta-223541	charcoal	7270 ± 40	Vc	8	600	6277	8227
Beta-223543	charcoal	7490 ± 40	Vc	25	625	6302	8252
Beta-223542	charcoal	7240 ± 40	Vd	25	650	6327	8277
Beta-223544	charcoal	7400 ± 40	Vd	10	660	6337	8287
Beta-236889	charcoal	7530 ± 50	Vd	10	670	6347	8297
Beta-236890	charcoal	7270 ± 50	Vd	10	680	6357	8307
Beta-236891	charcoal	7450 ± 50	Vd	10	690	6367	8317
Beta-223545	charcoal	7760 ± 40	Ve	10	700	6377	8327
Beta-250261	charcoal	7510 ± 50	Vf	50	750	6427	8377
Beta-250262	charcoal	7540 ± 50	Vf	12	762	6439	8387
Beta-250263	charcoal	7400 ± 50	Vf	13	775	6452	8402
Beta-250264	charcoal	7440 ± 50	Vf	12	787	6464	8414
Beta-250265	charcoal	7910 ± 50	VIa	13	800	6477	8427
Beta-250266	charcoal	7770 ± 50	VIa	25	825	6502	8452

Tab. 1 Linear Architectural Age Model and Results of Wiggle Matching for Ulucak (Phases VIa – IVb). Average Phase length: 50 years. Data: Çilingiroğlu (2009, 536).

the date of 8.6 ka cal BP is quasi-coincident with the present best age for Çatalhöyük phase VI[40] for which a number of potentially climate-related socio-economic changes has been identified in the context of biophysical and social vulnerability studies[41]. More or less immediately following (again within given cal-age ^{14}C-errors of c. ± 50 yrs), extreme social stress is documented at a number of sites in the Turkish Lake District[42]. It is also interesting to note that Ulucak was apparently continuously occupied, with no observable breaks[43]. This would be in accordance with a climatically driven coastal-refuge-model (i. e. ›Go to the coast = Go west‹) for the Neolithisation process, whereby during the RCC-period the settlers in central Anatolia would initially be attracted by the milder coastal locations and more reliable water sources. The

40 Newton – Kuniholm 1999.
41 Clare in prep.
42 Clare et al. 2008.
43 Çilingiroğlu 2009.

dating of Ulucak therefore supports previous proposals[44] that the spread of early farming from central Anatolia to south-eastern Europe may have had a climate background in RCC. We surmise that such an RCC-based Neolithisation model (›Go downriver to the coast‹) would also apply to the opposite side of the Aegean, as well as to the Balkans, and may ultimately help to explain the spread of early farming/animal management in the circum-Mediterranean. Such considerations – that follow directly from RCC modelling – are in such stark contrast to so many details of established Neolithisation concepts, e. g. the ›wave-of-advance‹ models, that corresponding discussion is beyond the scope of the present paper.

Conclusions

We recent palaeoclimate and archaeological research on Rapid Climate Change (RCC) in the Eastern Mediterranean. For this region, palaeoclimatologists have inferred the existence of six periods with distinct climatic anomalies, the most recent of which is the Little Ice Age. These anomalies all appear related to the same (but in archaeology not yet widely recognised) meteorological mechanism that at times caused the inflow of intensely cold and dry polar and continental air masses into the Eastern Mediterranean basin. One important component of the RCC mechanism is an expansion and intensification of the semi-permanent Siberian high pressure zone which leads to an influx of northern cold air masses into the Eastern Mediterranean. The cold air influx occurs quite regularly, although not every year, and typically only for several days to weeks during winter and early spring. Due to established correlations between Holocene sea surface temperature (SST) fluctuations in the Aegean Sea (documented in cores LC21, SL21, MNB3) and Greenland GISP2 nss [K^+] variations (as proxy for the Siberian High), these records can be used as sensitive proxies for Holocene polar air inflows to the Eastern Mediterranean. The GISP2 age-model forecasts the following intervals for most extreme (age-delimited) RCC-variability (1) 8.6–8.0 ka, (2) 6.0–5.2 ka, (3) 3000–2930 cal BP (~ 1050–980 hist BC).

During these delimited RCC periods in the eastern Mediterranean we observe abrupt abandonment at many locations, often in phases with major peaks in the GISP2- [K^+] and [Na^+] records, followed by a temporary switch from an agrarian to a more ephemeral pastoral mode of economy. Both these modes of reaction (site abandonment, economic switch) are so in phase (decadel scale) with RCC, occur in so many different regions, and are apparent in all presently known RCC periods, that this dating coincidence is unlikely to have a random background. However, lacking appropriate archaeological data, and with research guidance based on modern (or ethnographic) analogues yet to be explored, we can for the moment only give preliminary hypotheses for the observed reactions during the different prehistoric periods. For example, at the end of the southeastern European Copper Age, it appears that the multilayer tell communities were especially sensitive to climate perturbations. This may have been due to their central economic position within wider (dependent) exchange networks, as well as to enhanced social stratigraphy. However, there are indications that even the supposedly less sensitive pastoralist communities experienced increased climate-related stress during the second half of the 6000–5200 cal BP RCC interval[45].

Time-Scales and Terminology

Age-models and chronologies discussed in this paper are based on tree-ring calibrated ^{14}C-ages. Numeric ages are given on the calendric time scale using [cal BP] units, with AD 1950 = 0 cal BP as reference year, using CalPal software[46] and the INTCAL09 data set[47].

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An Anatolian Perspective on the Neolithization Process in the Balkans. New Questions, New Prospects

by Mehmet Özdoğan

An Overview in Retrospect

For over half a century, how the Neolithic way of life began in the Balkans has been one of the challenging problems of prehistoric archaeology. Through this time, answers to this problem have swayed from one extreme to other, occasionally being merged with political or ideological biases[1]. However, one of the reasons for this debate to continue without reaching a consensus has been the lack of concrete evidence from the interim zone between central Anatolia, a part of the core area of neolithization, and southeastern Europe. While archaeological research was at a standstill in northwestern and western parts of Turkey, a vast number of prehistoric sites were being excavated all over the Balkans, revealing subtle evidence on the progressive stages of early prehistoric cultures. Thus, by the 1970 s the outline of the Neolithic Period had already been set in most of southeastern Europe, particulars of cultural assemblages described and a certain terminology had developed; discussions were mostly focused on the correlation among various geographic units within the Balkans[2]. On the other hand, in the western parts of Anatolia, Hacılar remained the only source of dependable information, vaguely supported by Fikirtepe and the few sites observed on surface surveys[3]. However, over the last two decades the trend has been reversed; while there is now very little new data coming in from the Balkans, there has been an almost sudden influx of prehistoric excavations and surface surveys, both in the western parts of Anatolia and in eastern Thrace. This, as will be noted below, has not only shifted the focus of debate, but has also raised new questions, elucidating or invalidating some of the previous ones.

In the earlier years of debate, the main question was whether Neolithic cultures of the Aegean and southeastern Europe had been transmitted to Europe after having originated and developed in Anatolia, or whether there was an autonomous development of Neolithic way of life on European soil that had emerged independently of the East. After long years of debate, contrary views having polarized into two extremes, now at least a consensus has been reached on the eastern origins of European Neolithic cultures, however leaving timing of the initial dispersal and the trajectories followed as open questions. In the earlier years of research, in spite of the sequential deposit at Hacılar, the Neolithic period in western Anatolia was considered a short-lived episode; accordingly, it sufficed to label all early assemblages as ›Neolithic‹; correlations with the Aegean and the Balkans were based on this concept. However, now early sites, both in the western and northwestern parts of Turkey have been revealing thick stratified cultural deposits, clearly indicating that the Neolithic period in these parts was not an instantaneous and short-lived event, but on the contrary, of considerable duration. As a result, synchronizing the Neolithic assemblages within different sectors of western Anatolia has become a major problem to tackle. As our understanding of the Neolithic cultures in the western parts of Turkey developed, it also became clear that the momentum of change in the cultural assemblages was rather gradual and that there were no abrupt shifts in cultural elements. This made synchronization within the region and with the other regions rather difficult, making it dependent only on the availability and accuracy of radiocarbon dates. Thus, working out relative chronology that was not as apparent previously is now a major problem.

The diversity of the Neolithic packages is also an issue that has surfaced during recent years; previously the Neolithic package was described as a standard and rather simple entity. Along with staple crops such as certain cereals and legumes, domesticated animals, ground-stone artifacts, polished axes or chisels, pottery and sedentariness were considered to be the main components of the Neolithic assemblages, occasionally enriched by the presence of steatopygous figurines, beads or of other ornamental features. However, ongoing work in the western parts of Turkey has not only made it possible to redefine the Neolithic package, considerably enriching its content, but has also revealed that there was not a single uniform package, but a diversity of packages that varied according to region and time. These will be elaborated below.

It thus seems evident that the picture of the Neolithic of western Anatolia and of eastern Thrace has gone through revolutionary changes during the last two decades[4]. Even two decades ago in northwestern Turkey, including eastern Thrace, our knowledge of the Neolithic sequence was dependent on Fikirtepe, Pendik, Yarımburgaz and to Hoca Çeşme excavations; excavations at Aktopraklık, Ilıpınar, Menteşe, Barçın, Gürpınar, Yenikapı and Aşağı Pınar have provided subtle evidence, if not to resolve all problems, but sufficient to draw a dependable picture of the Neolithic cultures of the Marmara region. On the other hand, in the western parts of Anatolia, in the entire region to the west of the Lakes District covering an area almost as large as mainland Greece, no Neolithic Period sites had been excavated. Recent excavations at Keçiçayırı, Heybeli Dedecik, Çine Tepecik, Yeşilova,

1 Özdoğan 1997; Özdoğan 2007a.
2 Tringham 1971.
3 French 1965; French 1967.
4 Özdoğan – Başgelen 2007.

Ege Gübre, Ulucak, Çukuriçi Höyük, Latmos Beşparmak, and Peynirçiçeği Mağarası – located in the region between the Lakes District and the Aegean – are now filling the gaps in our knowledge and at the same time providing a new set of information.

Likewise, in the Lakes District, excavations at Kuruçay, Höyücek, and Bademağacı have not only diversified the picture of the Hacılar culture, but more specifically revealed both the forerunners and descendants of this culture. Further details became available from the cave sites, such as Karain, Öküzini and Suluin in the region of Antalya, testifying to the interaction between Mediterranean coastal areas and the central plateau. Along with the increased activity in the western parts of Turkey, there is now much more evidence from the primary core area of neolithization in Central Anatolia. New work at Çatal Höyük East and Çatal Höyük West has helped clarify a number of issues that were looked at with a certain degree of skepticism from the time of Mellaart. Previously ill-defined pottery assemblages of Erbaba and Süberde have been reworked and published[5]; and besides sustained work at Aşıklı and Köşk Höyük, more recent excavations at Tepecik Çiftlik, Musular, Gelveri, Pınarbaşı and Boncuklu have provided ample evidence to discern what was taking place in the core area of neolithization when certain groups were on move to previously uninhabited regions in the west. In view of all this new information, previous assessments now stand as simple generalizations that have totally overlooked the time dimension, diversity and the scope of Neolithic expansion. Thus, with this paper, instead of questioning old assumptions, we consider it more useful to define new questions.

When addressing questions related to the neolithization process in southeastern Europe, it is first necessary to focus on understanding the contact zone between Europe and Central Anatolia. It is also evident that the expansion of the Neolithic way of life from its core area in central Anatolia to western Turkey, and from there to the Balkans, is a rather complex multifarious process; thus the focus of questions to be formulated can vary considerably depending on how they are approached. In this respect, we consider it essential to at least develop an insight into the following issues, if not to fully resolve them. Clearly, the scope of this paper will not suffice to present more than an update complementary to our previous assessments[6].

The Date of the Initial Wave of Expansion

In earlier assessments, the westward expansion of the Neolithic elements was associated with the onset of the painted pottery tradition; this seemed evident as most of the Early Neolithic settlements in the Balkans had an extensive presence of rather developed painted pottery in their earliest layers. Nevertheless, there were some concerns whether the initial movement took place at an earlier stage, by the time of Hacılar IX–VI when unpainted monochrome pottery dominated the assemblages[7]. The discussion on this issue was somewhat distorted when Milojcic and Theocharis announced that they had recovered aceramic layers in Thessaly and in some other sites elsewhere in Greece[8]. Nevertheless, it is worth noting that the main motive in claiming the presence of a pre-ceramic horizon was not to suggest an earlier date for the beginning of the Neolithic horizon in the Aegean, but to demonstrate that there was a parallel with the Near East[9].

In the Aegean region, the debate centered on the existence of a Pre-Pottery horizon has finally been elucidated[10], but lately taken up in the western parts of Anatolia, though in a different context. In our surveys in the southern parts of the Marmara region, we had encountered some sites, Çalca being the most prolific one, revealing lithic assemblages that were reminiscent of the late Pre-Pottery Neolithic material of central Anatolia; thus we had surmised that the arrival of Neolithic elements could have taken place much earlier than previously assumed[11]. Later, this assumption was backed up with the recovery of flint points retouched by pressure flaking at Keçiçayırı in the Eskişehir region[12]. However, as neither of these sites had secure stratigraphic evidence and as the discussions were based solely on typology, no consensus was reached on their chronological position. In the 2009 campaign, ongoing work at Ulucak Höyük revealed the much-needed evidence to resolve this problem. Prior to the 2009 campaign, excavations at Ulucak had already reached the Early Pottery Neolithic horizon, revealing dates as early as 6500 BC[13] and deeper in the horizon, pottery sherds were getting extremely scarce; in 2010, at the deepest layer yet reached, excavators reported[14] that no sherds had been encountered and both the floors and the walls had red coating. Considering that the earliest dates are now revealing 7040 BC, and that excavations have not yet reached virgin soil, it seems evident that the establishment of the Neolithic settlements in the littoral areas of İzmir along the Aegean must date to the turn of the 8th to the 7th millennium BC. The recovery of red-coated floors and the absence of pottery sherds inevitably recalls the debate on aceramic Hacılar, claimed by Mellaart[15], where later a handful of sherds, all very crude, were recovered by Duru in associated fills[16]. There are good reasons to surmise that both authors were correct, as it has become quite clear through a number of sites in central Anatolia[17] that the introduction of pottery vessels to Neolithic life went through a rather slow process, pottery being a rather scarcely used commodity for several hundred years. In view of all these considerations, it now seems possible to put the date of initial dispersal of the Neolithic way of life from its

5 Özdöl 2006; Özdöl 2008.
6 Özdoğan 2005; Özdoğan 2006; Özdoğan 2008.
7 Schachermeyr 1976.
8 Milojčić 1960; Theocharis 1958.
9 Theocharis 1973, 33–35.
10 Reingruber 2005; also Reingruber this volume.
11 Özdoğan – Gatsov 1998.
12 Efe 1997; Efe 2005.
13 Çilingiroğlu forthcoming; Çilingiroğlu – Çilingiroğlu forthcoming.
14 Çevik 2010.
15 Mellaart 1970, 3–7.
16 Duru 1989.
17 Özdoğan 2009.

core areas in the east to the west, to the final stages of the Pre-Pottery Neolithic. It also seems evident that the transition from Pre-Pottery to Pottery Neolithic was not a synchronic event; there seems to have been certain areas or settlements that had already mastered pottery manufacturing and their vessels were dispersed to others as containers[18]. Accordingly, neither the absence nor the presence of potsherds in small quantities should be considered a chronological marker.

Neolithic Dispersal: Single Event or a Continuous Process?

One of the biases has been to consider the expansion of the Neolithic model from Anatolia to Europe as an instantaneous movement. In earlier years, the migratory model, as best described by Gordon Childe, implied a large movement of the Near Eastern communities that were already at an evolved stage of Neolithization, in a mode similar to that of Europeans colonizing North America. Even if this were to have taken several hundred years to reach target areas in Europe from its origins in the Near East, nevertheless, it was a singular event, migrant farmers taking to the road.

In the years that followed, any model based on migratory movements was not only rejected, but derided as ›Childean‹; nevertheless, during the last decade or so, there has been a reappraisal of the Near Eastern origins of the Neolithic of Europe, though with a different focus from that of Gordon Childe. In spite of the significant differences between the ›Childean‹ and current models, such as the ›wave of advance‹ or ›leap-frog‹ theories, in essence they all consider Neolithic dispersal as a singular event. The main difference between Childe's and other models is that Childe's migrant communities jump a long distance to establish a ›bridgehead‹, while others move shorter distances; however in each case arrival at a certain location happens only once. In this respect, the »chain migration« model[19] implying sustained relationships with the old homeland by constant back and forth movements between the core and periphery, seems to the only adequate explanation.

Recent work conducted in western Turkey has clearly indicated that the interaction between the core area and the regions newly settled by Neolithic communities was sustained without interruption for over a thousand years. Changes that can be discerned in the core area seem to have been reflected on the periphery, nevertheless with the evident traits of marginality. From the transition to the Pottery Neolithic, by the very end of the 8th Millennium BC, up to the late stages of the Middle Chalcolithic Period, first half of the 5th Millennium BC, similar ›fashions‹ or ›traits‹ can be followed on a supra-regional level in a vast area, which once had been called the »Balkano-Anatolian Cultural Sphere«[20]. This implies that the expansion of the Neolithic way of life was not an exodus – migrants cutting all their connections with the homeland – but on the contrary somehow keeping close ties with their

Fig. 1 Generalized map of cultural zones noted in the paper.

18 Özdoğan 2009.
19 Anthony 1997, 24.
20 Garašanin 1997; Garašanin 2000.

regions of origin. It also seems possible to surmise that the settlers were stimulating and even helping newly arriving groups to move further to the west.

As noted above, the study of Neolithic cultures in the Aegean and in the Balkans has a long history, while it is only during the last two decades that there has been an inflow of data from the western parts of Anatolia – on such a scale that after each excavation season it became necessary to revise our way of thinking. Thus, our knowledge of the neolithization process is still in its incipiency and some more time is necessary for all this unpredicted information to sink in. Nevertheless, on our current knowledge, at least three distinct waves of movement are discernable. The first or the initial one being rather sparse or sporadic, bringing in the bullet core technology and pressure flaking; whether or not this initial movement reached Thrace and the Balkans is not yet clear, however, considering the recovery of previously unpredicted finds from Crete[21] it would not be suprising if it may have been. Evidently, around 6400 BC, there was another, more dense movement, bringing in the so-called monochrome pottery tradition. Although dark burnished pottery wares dominate assemblages, there are also some creamy or pale burnished wares[22]; occasionally slip decorated or even more seldom painted sherds are also to be found within the assemblages. Sites such as Koprivets or Krainitsi in Bulgaria[23] indicate that this second wave extended up to the Danube in the Balkans as a rather thin coverage. As the date of this second wave corresponds more or less to the time of the so-called 8.2-Labrador event[24], it is possible to surmise that the second wave was triggered by environmental factors; however, there is still some controversy on the actual impact of this climatic event on the habitat[25]. The third wave took place by 5800 BC, bringing in a rich assemblage including painted pottery, figurines, pintaderas etc.

The third wave seems to be a much more organized movement, targeted particularly on the fertile alluvial plains, deliberately selecting areas of major springs as settlement locations. It is of interest to note that the settlers of the third wave deliberately avoided the regions that had previously been occupied by those of the second wave, using dark burnished monochrome wares. This seems to be an intentional or organized decision, with no indication of any conflict among the groups. This is most evident in the region of Marmara in northwestern Turkey. The eastern parts of the Marmara region had been rather densely occupied by the settlers of the second group, conventionally denominated as the Fikirtepe Culture[26]. As evidenced from sites such as Menteşe and Barçın, the establishment of Neolithic settlements dates back to 6400 BC and this monochrome culture was sustained in the region going through Archaic, Classic Fikirtepe and Yarımburgaz 4–3 stages up to 5500 BC. All over this cultural horizon, painted decoration is either absent or restricted to a few sherds, most of which is actually slip decorated. On the other hand, in eastern Thrace, as best evidenced at Aşağı Pınar layers 7 and 6 (Fig. 2–13), the cultural formation is almost totally different, dominated by fine burnished painted pottery that is identical to that of Karanovo I culture. What is striking is that there is no apparent interaction among these two groups, in spite of the

Fig. 2 Aşağı Pınar Layer 6 Pottery assemblage.

21 Personal communication with C. Runnels.
22 For example at Džuljunica, Krauß this volume, Fig. 2.
23 Todorova 2003.
24 Alley – Ágústsdóttir 2005.
25 Rollefson 2009; Weninger 2009; also Weninger – Clare this volume.
26 Özdoğan 2007b.

Fig. 3 Aşağı Pınar Layer 6, Tulip-shaped vessel akin to Karanovo I – II style.

Fig. 5 Aşağı Pınar Layer 5, bone spoons.

Fig. 6 Aşağı Pınar Layers 6 and 7, The so-called Karanovo blades of flint.

Fig. 4 Aşağı Pınar Layer 6, Tulip-shaped vessel akin to Karanovo I – II style.

Fig. 7 Aşağı Pınar Layer 7, Clay figurine akin to Karanovo I Körös tradition.

Fig. 8 Aşağı Pınar Layer 7, Festooned bone implements.

Fig. 9 Aşağı Pınar Layer 7, Clay pintadera.

Fig. 10 Aşağı Pınar Layer 7, Painted sherds in Karanovo I style.

short distance between them. The evidence of Aktopraklık, south of the Sea of Marmara, presents a somewhat different picture, presenting a variant of Fikirtepe culture with strong components of west Anatolia-Aegean red slipped wares together with some painted sherds. Accordingly, even though there are certain patterns and shared traits pertaining in cultural preferences, at the same time a considerable variation in the cultural formation and setup is apparent.

Neolithic Package or Packages?

The composition of the Neolithic assemblages has always been considered as the best indicator in tracing the expansion of this new way of life; however, it also became evident that assessments based on conventional components such as staple crops and animals, pottery, polished or ground stone objects and sedentism has not been of any help in understanding the complex mechanism of Neolithic expansion, as these appear as standard entities almost everywhere. Accordingly, during the last years there have been several concerns on this line, both elaborating and at the

Fig. 11 Aşağı Pınar Layer 7. Bichrome painted sherds in west Balkan style.

Fig. 12 Aşağı Pınar Layer 7–8, Clay figurine in Anatolian style.

Fig. 13 Aşağı Pınar Layer 7, 8 impressed decorated vessel.

same time expanding its contents[27]. Instead of considering Neolithic assemblages as a single and uniform package consisting of primary elements, we have attempted to try an alternative approach by sorting them out into all possible definable components and then to trace their development both in the chronological sequence and in their regional distribution. In selecting components, typological variants of tools and non-utilitarian objects, technological features, architectural employments, organization of the settlements have been considered together with subsistence patterns; in the primary stage of the study 52 components have been sorted and defined for analysis[28]. For the sake of clarity, sorting of the latter was done according to six zonal units (Fig. 1):

A) The core area where the Neolithic way of life began as early as the 11th or 10th Millennium BC,
B) Areas of initial expansion, mainly the immediate periphery of Zone A,
C) The regions dominated by the early monochrome assemblages,

27 Çilingiroğlu 2005; Kozlowski – Aurenche 2005; Özdoğan 2008.

28 Özdoğan 2010.

D) The Aegean and the Balkans,
E) The regions known as the Linear Band Ceramic cultures of central and western Europe,
F) Central and western Mediterranean, mainly the coastal strip covered by the Impresso and/or Cardium cultures.

It is however evident that to draw a definite boundary, especially for zones A, B and C is not possible; nevertheless, as the extensively excavated sites have piloted in defining zones and the sorting had been based solely on material recovered through excavation, indeterminate boundaries did not hamper sorting. Even though the work on this line is still in progress, it is still possible to draw the following conclusions:

1) Every component noted in zones B, C and D has its antecedents somewhere in zone A; however, their ratio in the assemblages of either region varies considerably. For example, while footed rectangular or triangular vessels, the so-called cult tables, are extremely rare in Zone A, they become much more common in Zone C and D.
2) There are a number of features that are restricted to Zone A; most of them are prestige objects that either require complex technologies or are made from materials that are difficult to procure, such as native copper. Such items are either totally absent in other regions or occur rarely as substitutes; in this context, the reddish colored terrazzo-lime floors of Zone A, are to be seen either as red coated floors or as poorly made lime coated floorings in Zones B and C, possibly reflecting social memory of such practices.
3) Even though every component noted in Zones B to D has its origins in Zone A, the composition of the assemblages differs considerably; it is not possible to find an identical equivalent of any assemblage in the other region. The regular or orderly composition of the core area assemblages, gives way to chaotic composition that becomes more apparent further away from Zone A. Thus, we surmise that the movement of the Neolithic communities at any time did not take place as one entire community migrating together, but as individuals or small groups originating from different parts of Zone A to form new clusters in the target area. Thus, we have suggested designating this movement as »segregated infiltration«[29]. We anticipate that through this analytical work, it will be possible to delineate trajectories followed during the westward expansion and also to trace their change in time.

Moving into a Void or Encountering Local Communities?

In most of Anatolia, as in Greece and southern Bulgaria, signs of Mesolithic or Epi-Paleolithic occupation are rather rare and seemingly confined to coastal areas[30]. Even if it is difficult to envisage extensive parts of the interior to be totally void of habitation; as sites of these eras have not shown up even in the most extensively surveyed areas, the density of occupation must have been rather low. The fact that in any of the coastal Epi-Paleolithic sites such as Öküzini in Antalya or Franchti in Greece there are no indicators suggesting interaction with the contemporary Pre-Pottery cultures of the core area, also implies the presence of regions devoid of habitation. Moreover, as in Öküzini or Karain, there is an apparent hiatus of several millennia between the terminal Epi-Paleolithic layers and the Pottery Neolithic horizons. Thus, it seems evident that Neolithic communities, at least in the initial stages, mostly moved into regions either totally or mostly uninhabited; it also seems plausible that the absence of communities around the core area was the reason why the Neolithic way of life did not expand previously. However, eventually local communities were encountered in regions further away from the core area, in regions densely populated by Mesolithic communities. What happened when these two groups encountered has been a major concern, and a number of different scenarios on both short- and long-term interaction have been suggested[31]. Even if all proposed scenarios make sense in their own line, it still seems as if what really had happened differed according to the region.

In this respect, the archaeological record in the eastern Marmara region has provided a unique opportunity to trace the contact among the two distinct cultural entities. The region around the present-day Bosporus in northwestern Turkey is one of the exceptional areas where the presence of Mesolithic assemblages known as the Ağaçlı group have been noted previously[32]. Even if no site of the Ağaçlı culture has been excavated, it presence only along the coastal strip of both the Black Sea and the Sea of Marmara testifies to the significance of marine sources in its subsistence. Even though micro blades and bladelets comprised a significant part of the Ağaçlı assemblages, they were exclusively of direct percussion. Fikirtepe culture represents the initial arrival of Neolithic culture in this region, evidently originating from west-central Anatolia in around 6400 BC. Even though further south of the Eskişehir-Afyon plateau Fikirtepe culture merges with those of the Lake District cultural assemblages, in an extensive area from Eskişehir up to İstanbul it occurs with its own characteristic features[33]. Numerous excavations including Demircihöyük in Eskişehir region, Ilıpınar, Menteşe and Barçın west of Bursa, Aktopraklık in Manyas basin, Fikirtepe, Pendik and Tuzla along the eastern coastal strip of Marmara, Yenikapı and Yarımburgaz on the European side of İstanbul have provided ample information both on its features and sequential development. In this respect, comparing the Fikirtepe assemblages of the inland sites where no Mesolithic sub-stratum was present with those in the area of Mesolithic Ağaçlı group around İstanbul provided an insight into how these two distinct cultures interacted. Fikirtepe pottery has very standard features[34]. From Demircihöyük in the south up to Yenikapı in İstanbul, the pottery is identical in almost

29 Özdoğan 2008; Özdoğan 2010.
30 Özdoğan 2008.
31 Bentley et al. 2003; Gronenborn 1999; Harris 2003; Perrin 2003; Pinhasi 2003; Price 2000; Richards 2003; Sherratt 2004; Zvelebil 2002.
32 Gatsov – Özdoğan 1994.
33 Özdoğan 2007b; Özdoğan forthcoming.
34 Özdoğan 1997; Özdoğan 2007b.

every site of this culture; the likeness is seen in typological composition and technologies employed in manufacturing as well in decoration. Likewise, special tools such as bone spoons, spatulas, celts, adzes, hooks ear studs, the origins of which can be traced back to the core areas in central Anatolia, are identical in every Fikirtepe site. The same is true also for all domestic animals and cultivated plants. However, in other components of the culture, there are significant differences between the inland and coastal sites around İstanbul. Buildings in the former have rectangular ground plans, using wooden posts, clay slabs and daub. On the other hand, all buildings so far excavated around İstanbul are round or ovoid hut-like structures in wattle and daub technique with no indication of using either wooden posts or mudbrick slabs. The subsistence of the inland sites is exclusively based on farming, with little or no use of hunting or fishing; however those around İstanbul have a mixed subsistence economy, with extensive mollusk collecting, open sea fishing, hunting as well as farming and keeping domestic animals. There is also a marked difference between the burial customs of inland and coastal sites; the former evidently has extramural burials, mainly in the crouched position, with few burial gifts. The coastal sites have sub-floor burials in the wattle and daub houses, and more significantly, along with contracted inhumations they also employ cremation as revealed at Yenikapı[35]. Further comparative analysis of the two groups indicates other differences in various aspects of culture, such as the lithic technology[36]; this all leads to suggest that the encounter of the Mesolithic Ağaçlı group with the Neolithic Fikirtepe communities was rather peaceful, the former adapting certain aspects of culture and merging them with those of their own. Nowhere in the area there is any indication of violence or tension. However, this does not imply that the scenario was repeated in other regions further west in Europe.

Concluding Remarks

Over the last two decades we have been trying to make an assessment of the interaction among Anatolian and southeast European cultures during the Neolithic period; as more details became available, it became possible to elaborate on generalized assessments and to consider the problem from a new perspective. Previously we were looking into the extensive information that had accumulated in the Balkans for decades, anticipating that the answers would come from this seemingly ›secure‹ set of data. However, as information became available from the western parts of Turkey, it became clear that the picture based on the evidence of southeastern Europe was short of reflecting what actually had happened. Firstly, certain biases had turned into preconceived clichés in the archaeology of the Balkans, which regretfully could be traced in the literature as selective publication of the finds. Secondly, most of the sites had revealed homogenous assemblages so perceiving a pattern was rather difficult.

Even though the number of excavated sites of the Neolithic period in Anatolia is still too few compared to southeastern Europe, it nevertheless is enough to reveal that the previous trajectories of thinking were not correct. As connoted above, the new evidence from Anatolian sites clearly revealed that the neolithization process was not an instantaneous event, but that it developed through different trajectories and modes over millennia. Previous models on how Neolithic culture expanded to cover other regions were mostly unilateral; however now it became clear that the neolithization process was a complex phenomenon, so multifarious that no single model would suffice on a supra-regional basis. As has been noted above, the expansion did not take place as a single group or band migrating from point A to B; segregated groups leaving the core area were forming new clusters either on the way or in the newly settled areas, occasionally merging with local communities.

In considering the expansion of the Neolithic model, the process of adaptation that migrant communities had to go through is mostly overlooked. The core area of primary neolithisation, in this case central Anatolia, is a closed basin predominantly steppe-like in character, at least compared to the areas to be settled by the migrant groups. The interim zone between central Anatolia and the coastal areas, either the Aegean or the Marmara region, consists of diverse habitats that are notably different from the core area. Accordingly the migrant groups had to move into and get adapted to totally different habitats from those they were accustomed to. At present we only see the shift from mudbrick to wooden or wattle constructions as the markers of this process; however, we can only surmise that the process of adapting to the new environmental conditions must have been a much more complicated phenomenon than that. In fact, the process of adaptation to the marine, humid and densely forested habitats in the western parts of Turkey, must have provided an experience like that of encountering temperate Europe.

The cultural setup of the Neolithic settlements in the newly settled zones, compared to those in the core area, are clearly marginal; further to the west, settlement sizes notably decrease, status building no longer exists and the number of prestige objects becomes minimal. Evidently, in cultural complexity, those in the western parts of Turkey are peripheral compared to those in central Anatolia; however at the same time they are to be considered as the ›core‹ to those further west. Accordingly, the entire process needs to be considered not as stable but as ›moving‹ cores.

35 Algan et al. 2009; Kızıltan 2010.

36 Gatsov 2005; Gatsov 2009.

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Neolithic Stamps and the Neolithization Process. A Fresh Look at an Old Issue

by Clemens Lichter

Introduction

Apart from the way of life, Neolithic cultures of the Near East and southeastern Europe are linked by several common cultural elements and objects: figurines, painted pottery, bone spatula or spoons, sling missiles and stamps. As a common feature, these objects seem to be of minor importance in the area of origin of the Neolithic – in the hilly flanks of the Fertile Crescent during the initial phase of the Neolithic. Their importance was much greater in a more developed phase of the Neolithic, starting in the first half of the 7th millennium BC in central- and western Anatolia and southeastern Europe.

A term used frequently for the abovementioned artifacts is ›Neolithic package‹, a term which has never been defined clearly[1]. The name suggests that these elements appear jointly, and the observation that some of these elements have been documented in the earliest phases of many settlements has often been used in favor of a migration argument – the immigration of Neolithic farmers – and against a diffusion – the transmission of Neolithic know-how and the diffusion of agricultural products. Irrespective of whether such a conclusion can be drawn, the fact that the elements of the ›Neolithic package‹ do not appear everywhere and in the same period has often been overlooked. Whereas some regions see the appearance of all the Neolithic elements without any evidence of local adaptations or preferences, other areas present a different set or composition[2]. A critical review of interpretations and misuses might be a useful tool not only for an evaluation of the history of research; trying to explain the emergence of the Neolithic in Europe first requires a reassessment of interpretations that have come to be accepted.

It is quite evident that the term ›package‹ is misleading[3] and does not reflect the heterogeneity and variety of the Neolithic. The emergence of the Neolithic in western Anatolia, Greece and the Balkans was not a continuous, evolutionary or logical process; rather, it was one that owed much to communication channels, transfer of agricultural know-how, local adaptation as well as regional preferences, since a more detailed observation of elements of the Neolithic package shows quite a lot of regional distinctions.

The association of clay stamps – sometimes labeled as ›pintaderas‹ – with questions of Neolithization goes back to the 1960s. The excavation in Nea Nikomedea[4] yielded stamps similar to those found in Çatal Höyük[5]. Another important step was the publication of János Makkay[6], dealing with southeast European clay stamps. Since then, the phenomenon of these objects was frequently used as an argument to support models and concepts of Neolithization.

Stamps are well known from the Neolithic and Chalcolithic cultures of Anatolia, the Balkans, the Carpathian Basin and Italy. The earliest examples from the first half of the 7th millennium were found in central Anatolia[7], while the clay stamps in Greece[8] and southeastern Europe[9] are widely spread from the end of the 7th to the 4th millennium BC.

Outside this area, only few pieces have come to light; in the Near East, in the area of the fertile crescent, only few examples are known. Examples from Jericho[10], Jarmo[11], Byblos[12] and Ras Shamra/Ugarit[13] are quite different from those from Anatolia and southeastern Europe. A round clay stamp with a pattern of concentric circles is the only example from Çayönü[14]. Türkcan[15] postulates the existence of two traditions in two different areas evolving at different rates – one in the northern Levant, including the Ras Shamra stamps, and another of Anatolian origin.

In Italy[16] two areas can be distinguished – one in northwestern Italy from the late 6th and the 5th millennium BC, and a second in southeastern Italy, from the mid-6th to the 4th millennium BC. Some examples have been detected in the Trentino area[17] as well as north of the Alps in southwestern Germany[18]. One piece found in Arconciel/La Souche (Switzerland)[19] derived from a Mesolithic context (around 6000 BC) and seems to underline contact between Neolithic farmers and Mesolithic hunter-gatherers.

Given their widespread occurrence over space and time, we cannot expect that the clay stamps were used in the same manner or had the same meaning or significance over a period of nearly 4000 years and such a huge area. On the other hand – ignoring the scientific value of ›pintaderas‹ as a basis for answers to important questions would be throwing the baby out with the bathwater.

Our focus here is on the patterns of the stamping surface within the different regions, since other aspects of the

1 Çilingiroğlu 2005.
2 Çilingiroğlu 2005.
3 Çilingiroğlu 2005.
4 Rodden 1989.
5 Mellaart 1967; Türkcan 2005.
6 Makkay 1984.
7 Türkcan 2005.
8 Pini 2004, 7–10 lists all stamps from Greece.
9 Makkay 1984; Makkay 2005.
10 Kenyon – Holland 1982.
11 Broman Morales 1983.
12 Dunand 1973.
13 de Contenson 1992.
14 Özdoğan 1995, 97 pl. 7.
15 Türkcan 2005, 184.
16 Cornaggia Castiglioni – Calgari 1978; Skeates 2007.
17 Marzatico 2002, 25 fig. 3.
18 Aulendorf: Köninger – Schlichtherle 1993, 65 fig. 29.
19 Mauvilly et al. 2007, 8.

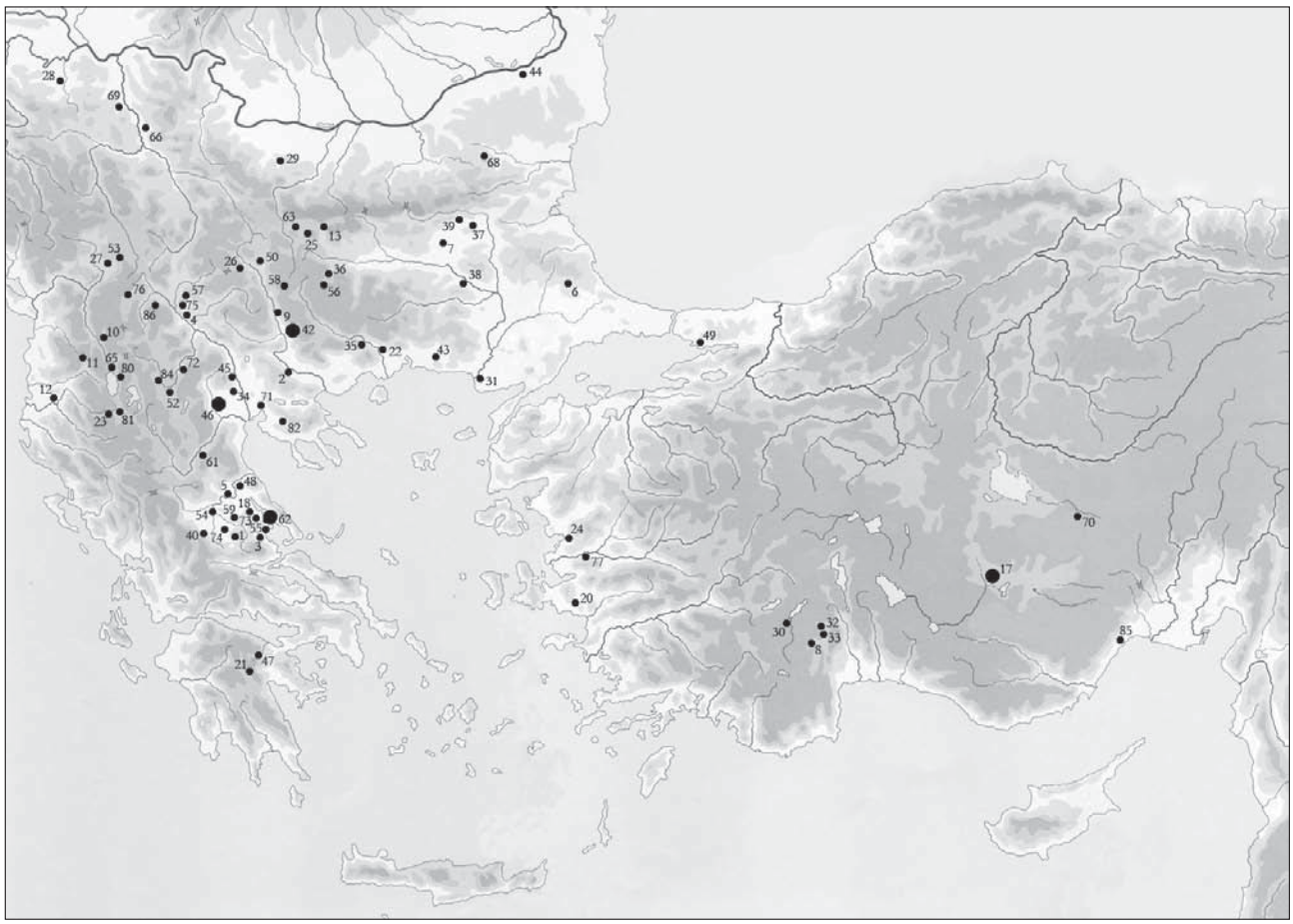

Fig. 1 Sites with stamps from the 7th and the 6th millennium BC in Central Anatolia, Western Anatolia, Greece and the Southern Balkans (big dots mark sites with more than 9 stamps found).
1: Achilleion (CMS 5 Suppl. 1B, no. 21; Makkay 1984, no. 1) – 2: Aj. Jórjios [2] (CMS 5 Suppl. 1B, no. 24. 30; CMS 5 Suppl. 3, no. 200) – 3: Almyrós (CMS 5, no. 718; Makkay 1984, no. 5) – 4: Anzabegovo-Barutnica (Makkay 1984, no. 7) – 5: Argissa-Magula (CMS 5, no. 515; Makkay 1984, no. 9) – 6: Aşağı Pınar – 7: Azmak [8] (Makkay 1984, no. 10–16; Makkay 2005, no. 2; Dzhanfezova 2003, type I, 3. 7. 9a; Georgiev 1967) – 8: Bademağaı [8] (Duru 2007, 340; fig. 70–77; Umurtak 1999/2000, fig. 3) – 9: Bălgarčevo: [2] (Dzhanfezova 2003, type I. 7; Makkay 1984, 290; Antikenmuseum Basel und Sammlung Ludwig 2007, no. 20) – 10: Burimas (Makkay 2005, no. 10; Korkuti 1995) – 11: Burim-Peshkopi (Makkay 1984, no. 291) – 12: Cakran de Fieri (Makkay 1984, no. 34) – 13: Čavdar [3] (Dzhanfezova 2003, type I. 1–3; Georgiev 1981, fig. 54a–c; Makkay 2005, no. 12) – 16: Çayönü (Badisches Landesmuseum Karlsruhe 2007, Catalog no. 404) – 17: Çatal Höyük [34] (Badisches Landesmuseum Karlsruhe 2007, Catalog no. 406–408. 410–411; Türkcan 2005, fig. 8. 1–2) – 18: Chara [5] (CMS 5 Suppl. 1B, no. 25–26. 29; CMS 5 Suppl. 3, no. 203; Γαλλής 1992, no. 133 fig. 23c) – 19: Damianós [2] (CMS 5 Suppl. 3, no. 300–301) – 20: Dedecik-Heybelitepe (Herling et al. 2008, 26 fig. 8, 3) – 21: Dendra [2] (CMS 5 Suppl. 3, no. 202. 205) – 22: Dikilí Tásch (CMS 5, no. 449; Makkay 1984, no. 48) – 23: Dunavec (Makkay 2005, no. 24; Korkuti 1995, pl. 42, 10) – 24: Ege Gübre [3] (Sağlamtimur 2007, fig. 12–14) – 25: Elešnitsa (Dzhanfezova 2003, type II, 1; Nikolov – Maslarov 1987, fig. 9; Makkay 2005, no. 25) – 26: Gălăbnik [2] (Dzhanfezova 2003, type I, 3; IV, 1; Chochadziev 1990, fig. 4; Antikenmuseum Basel und Sammlung Ludwig 2007, no. 23) – 27: Gladnice kod Gračanice (Galeria Srpske Akademije nauka i Umetnosti 1998, 442, no. 34) – 28: Grabovac-Vinogradi [2] (Makkay 1984, no. 76–77) – 29: Gradešnica [2] (Dzhanfezova 2003, type I, 3; I, 5; Nikolov 1974, fig. 8. 22) – 30: Hacılar (Mellaart 1970, fig. 187, 1–7. 10) – 31: Hoca Çeşme [4] (Özdogan 2007, fig. 24a, c, f, g) – 32: Höyücek [5] (Duru – Umurtak 2005, tab. 132, 3–4. 142, 2–4) – 33: Höyük Tepesi (Badisches Landesmuseum Karlsruhe 2007, Catalog no. 414) – 34: Jannitsá B [3] (CMS 5 Suppl. 3, no. 302–304) – 35: Kalambáki (CMS 5, no. 450; Makkay 1984, no. 110) – 36: Kapitan Dimitrievo [2] (Dzhanfezova 2003, type I, 3; Makkay 2005, no. 50) – 37: Karanovo (Makkay 1984, no. 119) – 38: Kărdžali [3] (Dzhanfezova 2003, type I, 7, 9b; Makkay 1984, no. 296; Pejkov 1978, fig. 38) – 39: Kazanlăk (Dzhanfezova 2003, type I, 3; Makkay 1984, 122) – 40: Kirditsa (CMS 5 Suppl. 1B, no. 23) – 41: Koutsochiro II (CMS 5 Suppl. 1B, no. 462) – 42: Kovačevo [13] (Dzhanfezova 2003; Makkay 1984, no. 298; Perničeva 1990, fig. 14, 2; Demoule – Lichardus-Itten 1994, fig. 17) – 43: Makríjalos [4] (CMS 5 Suppl. 3, no. 408–410. 423) – 44: Malăk Preslavec (Dzhanfezova 2003, type I, 3) – 45: Mándalo (CMS 5 Suppl. 1B, no. 184) – 46: Nea Nikomedia [21] (CMS 5, no. 691–711; Makkay 1984, no. 150–170) – 47: Nemea, Tsoungiza (CMS 5 Suppl. 1B, no. 127) – 48: Nessonis [3] (CMS 5, no. 514. 722–723; Makkay 1984, no. 173–175) – 49: Pendik (Pasinli et al. 1994, fig. 18) – 50: Pernik (Dzhanfezova 2003, type IV, 1; Chochadziev 1990, fig. 5, 6; Braunschweigisches Landesmuseum 1982, no. 17a) – 51: Philia (CMS 5 Suppl. 1B, no. 28) – 52: Porodin [4] (Makkay 1984, no. 188–190. 192) – 53: Priština (Makkay 1984, no. 196) – 54: Prodromos (CMS 5, no. 724; Makkay 1984, no. 197) – 55: Pyrasos (CMS 5, no. 720; Makkay 1984, no. 199) – 56: Rakitovo [2] (Dzhanfezova 2003; Matsanova 1996, tab. 12, 3–4) – 57: Rug Bair [3] (Makkay 1984, no. 203–205) – 58: Sapareva Banja (Dzhanfezova 2003, type I, 3; Georgiev et al. 1986, fig. 31) – 59: Sáppio [5] (CMS 5 Suppl. 3, no. 196–197. 201. 206; CMS 5 Suppl. 1B, no. 32) – 61: Servia (CMS 5 Suppl. 3, no. 192) – 62: Sesklo [16] (Papathanassopoulos no. 281; CMS 1, no. 1–4; CMS 5, no. 712–717; CMS 5 Suppl. 1B, 463–467; Makkay 1984, no. 218–226. 301–303) – 63: Slatina [3] (Dzhanfezova 2003; Petkov 1961, fig. 8, 2–4; Antikenmuseum Basel und Sammlung Ludwig 2007, no. 21) – 64: Slg. Thavmakos (CMS 5 Suppl. 1B, no. 27) – 65: Struga nad Drim (Kusmen 2007, fig. 1. 3) – 66: Supska (Makkay 1984, no. 236) – 67: Sykies (CMS 5 Suppl. 3, no. 427) – 68: Tărgovište (Dzhanfezova 2003, type I, 3; Panayotov – Angelova 1986, 97) – 69: Tečić (Makkay 1984, no. 247) – 70: Tepecik-Çiftlik (Badisches Landesmuseum Karlsruhe 2007, Catalog no. 412) – 71: Thessaloniki (CMS 5 Suppl. 3, no. 406) – 72: Trn-Golema Tumba [4] (Makkay 1984, no. 266–269) – 73: Tsangli Magula (CMS 5, no. 719; Makkay 1984, no. 270) – 74: Tsani Magula (CMS 5, no. 721; Makkay 1984, no. 271) – 75: Tumba Madžari (Semrov – Turk 2008) – 76: Tumba Stence (Semrov – Turk 2008) – 77: Ulucak [3] (Çilingiroğlu – Çilingiroğlu 2007, 351; fig. 15. 27; Badisches Landesmuseum Karlsruhe 2007, no. 415) – 78: Westanatolien (CMS 5 Suppl. 3, no. 474–475) – 80: Usta nad Drim (Makkay 1984, no. 274) – 81: Vashtëmi (Korkuti 1995, pl. 15, 12) – 82: Vassilika (CMS 5 Suppl. 3, no. 424) – 83: Vaksevo (Dzhanfezova 2003, type I, 3; Chochadziev 2001, fig. 35, 5) – 84: Veluška Tumba [2] (Makkay 1984, no. 275–276) – 85: Yumuktepe/Mersin (Caneva 2007, 204; fig. 25) – 86: Zelenikovo-Slatina (Makkay 1984, no. 285–286) – 87: Zerelia (CMS 5 Suppl. 1B, no. 448; Makkay 1984, no. 288).

stamps have already been discussed[20]. Nevertheless, some basic results will be mentioned here.

In the following, stamps from the southern Balkans, Greece and Anatolia from the 7th and the 6th millennium BC will be examined. Around 250 pieces can be taken into consideration; 33 of them were made of stone.

Around 70 stamps from Turkey have been published so far – nearly 50 from Çatal Höyük, half coming from Mellaarts excavation, the others from new excavations[21]. Field research in the lake district[22] as well as in central-western Anatolia in recent years has brought to light some more examples[23].

In northwestern Anatolia, especially the area of the Fikirtepe culture during the second half of the 7th and the first half of the 6th millennium, stamps were almost absent. None are found in Fikirtepe, Ilıpınar, Menteşe or Demircihöyük. The only exception is a pintadera found in Pendik[24] with similarities to a stamp from Ege Gübre in Ionia[25].

Further to the west, around 120 stamps are known from Greece[26], 88 of clay and 33 made of stone. Most of these came from northern Greece, from Macedonia and Thessaly, whereas stamps from southern and western Greece are rare.

We know of 25 clay stamps the Republic of Macedonia (FYROM)[27]. Some 75 examples are known from the early and middle Neolithic cultures of the southern Balkans[28]. In Thrace, clay stamps are quite rare; there are only few pieces from Karanovo and Azmak. One piece from Aşağı Pınar[29] seems to be the only example from Turkish Thrace so far. However, stamps are more numerous in western Bulgaria. Pieces from the Carpathian Basin further to the north[30] will not be examined here.

The occurrence of clay stamps observed might partly be due to the intensity and history of research. Yet there are indications that the emerging picture comes close to the real dissemination of these objects:

In spite of the vast geographical area in which clay stamps have been used, pintaderas are quite rare and a few sites seem to dominate the picture. For example, from Çatal Höyük we have knowledge of nearly 50, in Nea Nikomedea about 20 have been excavated and from Sesklo 16 have been published. In Kovačevo in western Bulgaria a dozen pieces have come to light. One gets the impression that there are sites within a region where these objects were used, whereas at other sites their use was not practiced. On the other hand we cannot dismiss the possibility that stamps made of organic material, i. e. wood, were in use, and were not preserved.

The early appearance of clay stamps in Anatolia – so many of the Çatal Höyük stamps predate those found elsewhere – as well as the great variety of shapes and patterns leads us to the conclusion that the origin of this cultural element was likely in central Anatolia.

Clay Stamps and their Use …

From the constitution of the stamping-surface one can distinguish at least two different types: one with a positive ornament, where indentations show the motif or pattern and a second type, with a negative ornament, where the spaces between the indentations were wide and deeply cut, leaving a mark in soft materials. In German this distinction is ›Flächenstempel‹ and ›Siegelstempel‹, although we cannot conclude that these pieces were really used as seals[31].

Some clay stamps from Macedonia show a convex stamp-surface, suggesting that they were used in a different way. The same observation has already been made for some examples from Byblos[32]. A piece from Jericho[33] could not be used to decorate other materials, since the motif was not cut in deep enough. For the same reason two objects from Çatal Höyük[34] could not be used to decorate other objects. Moreover, which is more important – the clay of the piece from Jericho was not fired and the same has been observed with the one from Jarmo[35].

Another striking fact is the difference in quality, concerning the chosen raw material as well as the amount of labor invested. Some pieces show a very skilful treatment, i. e. the stamps made of stone from Greece which appear to have been made by a specialist. Other pieces seem to be produced ad hoc, with only a little expenditure of time, raw materials and supplies.

So one question is whether these stamps stood for the same set of ideas – wherever they appeared – or if the meaning varied from one cultural setting, region, or site to another.

The differences within this group of objects, merged under the label ›stamp‹ in the archaeological literature, make a uniform, supra-regional and timeless function – even within the area of Anatolia, Greece and the Balkans – implausible.

20 Budja 2003; Çilingiroğlu 2009; Naumov 2008; Skeates 2007; Skeates 2008; Türkcan 2005.
21 Türkcan 2005.
22 Duru 2007; Umurtak 1999/2000.
23 I. e. Ulucak: Çilingiroğlu 2009; Ege Gübre: Sağlamtimur 2007, 365 f. fig. 12–14; Dedecik: Herling et al. 2008, 26; fig. 8, 3.
24 Pasinli et al. 1994, fig. 18.
25 Sağlamtimur 2007, 365; fig. 12.
26 Pini 2004.
27 Naumov 2008.
28 Makkay 1984; Makkay 2005; Dzhanfezova 2003; Kuncheva-Russeva 2003.
29 Pers. comm. H. Schwarzberg.
30 I. e. Makkay 1984; Makkay 2005.
31 Pini 2004.
32 von Wickede 1990, 65; fig. 26. 1–9.
33 von Wickede 1990, 40, fig. 20. 2.
34 Türkcan 2005, fig. 8. 2, 25–26.
35 Broman Morales 1983; von Wickede 1990, 40; fig. 20. 1.

… Have Nothing to Do with Near Eastern Seals …

Different reasons – among other things the denomination ›stamp seal‹ or the overlap of the distribution areas of clay stamps and real ›seals‹ – led to the conclusion that clay stamps were the forerunners of the later Near Eastern seals, which were applied on baskets or bags, to show ownership or to classify contents in communal storerooms of settlements. This approach has been rejected for several reasons[36]: First and foremost, clay stamps and the Near Eastern seals are found in completely different cultural contexts. The only commonness is the act of stamping; the meaning in the cultural context is different. Especially over a time scale of more than 4000 years, a change in cultural behavior seems much more probable.

A seal is an object to seal vessels, containers or rooms, to mark property and goods and to protect them from unauthorized access. In Near Eastern archaeology the term glyptic is used, including seals made of stone and other materials. As Alwo von Wickede has already pointed out[37], glyptic is derived from amulets and pendants.

A common feature of amulets/pendants and seals is that the raw materials used are often precious, like jadeite, rock crystal, lapis lazuli, metals or ivory. These precious materials have been chosen to make it hard to reproduce the seal. The designation of ownership using seals is only useful if one person or a group of persons have access to the seal and the seal belongs to the bearer alone. Although clay stamps have different patterns, the careless production of some of these pieces as well as the missing of imprints attesting sealing, mean there is no reason to suspect they were used to mark property.

From the archaeological contexts in which the pintaderas have been found, one can deduce information concerning the use of these objects.

In Çatal Höyük we have evidence from buildings and the spaces between buildings from layer VII – II. The stamps were not limited to special houses or groups of houses. Two pieces from Çatal Höyük were found in burials[38]. Shrine A1 (Layer II) four stamps were found on the floor – together with little hammering stones – an observation which leads to the conclusion that these were used to apply color. Türkcan discussed the observation that stamps became more numerous in the later phases of Çatal Höyük, at the same time the wall paintings became less frequent. He suggested that in the later phases the decoration of walls with stamped textiles became more popular. A house in Sesklo yielded three pieces, other clay stamps were not found together. New findings from Ulucak[39] underline and sustain the interpretation that at least some of the stamps were used to decorate textiles. Goce Naumov[40] mentions that a number of stamps from Macedonia showed traces of color. Indications of color have been recognized on a pintadera from Ege Gübre[41].

In conclusion it has a lot to commend it, that the clay stamps were used to decorate various materials prone to fading, i. e. skin, leather, textiles or bread. Imprints in clay have not been found. Some authors declare that these stamps were used to decorate the human body. On the other hand the evidence of paint is scarce. Other examples have not been used to imprint surfaces or to apply a paint pattern: their only use seemed to carry the motif or symbol and not to apply it to another object or material.

Different Patterns

Stamps used to produce patterns had a number of advantages: the motifs could be reproduced quickly and easily, they could be used in various situations to mark, identify or protect the objects marked, or simply to decorate objects. So clay stamps might have been tools to reproduce culturally significant information – as part of an ornamental language. These ornaments can be detected on other media, i. e. textiles, tattoos, walls, pottery etc. Pseudo-meander patterns were found on clay stamps and wall paintings from Çatal Höyük. They also appear on its later pottery. The leopard and the bear appear in the wall paintings and reliefs, but their bones have not been found at the site[42]. The recurrence of motifs on other media has been detected in other regions as well[43].

In the following I will examine the question of whether the clay stamps show specific, local patterns or motifs and whether a comparison of these patterns reveals relationships between the distinct regions over which clay stamps were distributed. Although we have to assume – as already shown – that clay stamps were used to decorate completely different materials, a comparison of motifs and patterns might show different connotations.

Chronology is of minor importance and will not be taken into consideration, since many clay stamps cannot be precisely dated. Many were found on the surface or in undated or unclear archaeological contexts. If we limit our examination to the examples with a fixed chronological position, our basis gets too small. In Çatal Höyük stamps occur from Level VII onwards (mid of the 7th millennium) and at Ulucak[44] we have evidence of stamps starting in the 2nd half of the 7th millennium. Clay stamps occur in Greece during the later stages of the Early Neolithic in the last quarter of the 7th millennium, yet most of them belong to the Middle Neolithic, the first half of the 6th millennium[45], at the time when the Neolithic was coming to parts of the southern Balkans. In southeastern Europe stamps are missing from the so-called ›monochrome‹ horizon[46] – i. e. they don't belong to the initial phase of the Neolithic; rather, they are found with painted pottery[47].

36 von Wickede 1990.
37 von Wickede 1990.
38 Türkcan 2005, 175–179.
39 Çilingiroğlu 2009.
40 Naumov 2008, 186.
41 Sağlamtimur 2007, 365 fig. 12.
42 Türkcan 2007.
43 Naumov 2008, 193; Reingruber 2008, 598 f.
44 Çilingiroğlu 2009, 12.
45 Reingruber 2008, 599 f.
46 On the problem of the monochrome pottery cf. Krauß, this volume.
47 Dzhanfezova 2003; Naumov 2008.

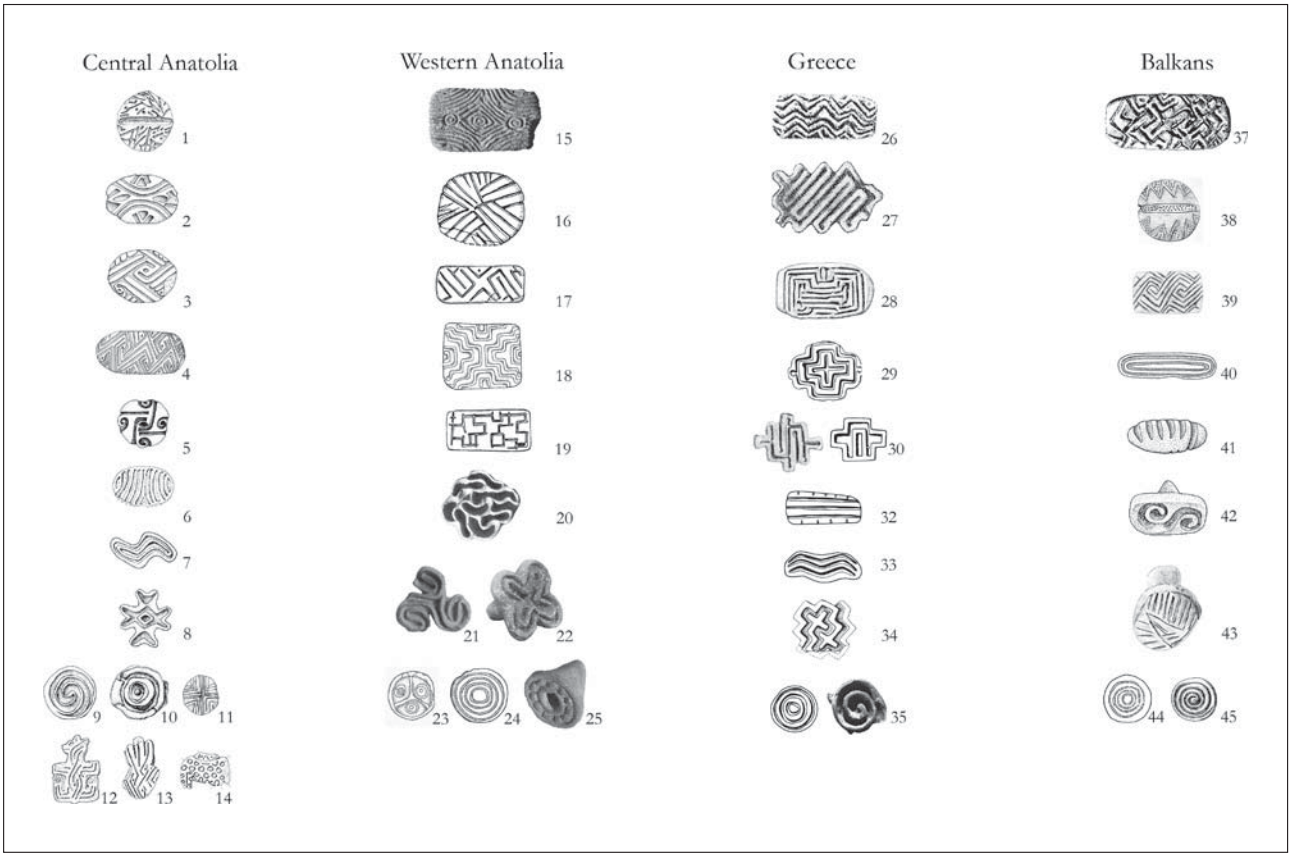

Fig. 2 Stamps/pintaderas from different regions.
1–14 Çatal Höyük (after Türkcan 2005; Türkcan 2007) – 15, 20, 25 Bademağacı (after Duru 2007) – 16, 17, 19 Hacılar (after Mellaart 1970) – 18, 23, 24 Ulucak (after Çilingiroğlu 2009) – 21, 22 Ege Gübre (after Sağlamtimur 2007) – 26 Nea Nikomedea – 27 Achilleion – 28, 29, 30, 32, 35 Sesklo – 29, 33 Nessonis – 34 Zerelia – 37 Pernik – 38 Porodin – 39 Usta nad Drim (after Makkay 1984) – 40 Burimas (after Korkuti 1995, taf. 82, 4) – Dunavec (after Korkuti 1995, taf. 42, 10) – 42 Trn Mala Tumba – 43 Trn Golema Tumba – 44 Kovačevo – 45 Kărdžali (after Makkay 1985).

Supraregional Comparison

Forms

The clay stamps come in a variety of shapes; in most cases they are round or oval. Rectangular ones sometimes have rounded corners, multi-cornered stamps are rare. Handles are conical, cylindrical, semi-circular or plain. These contours can be detected in Anatolia as well as in the Balkans and Greece.

Other shapes, like the arched and wavy found in Çatal Höyük and Sesklo become less frequent to the north an west and were unknown in the southern Balkans.

A piece from Bademağacı[48] and one from the site of Struga nad Drim in Macedonia[49] show an s-shaped contour. X- or cross shaped forms are only sporadic.

Two pieces from Çatal Höyük[50] show the outline of a bear and a leopard respectively, while two further pieces from this site resemble feet or were pad-shaped. No equivalent of these pieces has been recorded in the other regions.

The contour is often attended by the pattern and is part of the pattern. On the other hand, arches, waves or cross-like patterns can also be found on clay stamps with a round, oval or rectangular outline[51].

A special feature is a rhomboid, stepped contour, which is found mainly in Greece. This form in particular is quite often associated with a meander or labyrinth pattern. Another distinctive feature can be observed on some pieces made of stone: the beginning or end of grooves or corner points are marked by regular, probably drilled deeper indentations. These indentations might in first instance be the result of the production process since they can only be observed on examples of stone. The indentations had been drilled in order to get exact fix-points for layout and manufacture of the lines and were a secondary part of the pattern.

To conclude, a great variety of forms can be observed in Central Anatolian Çatal Höyük; other regions or sites seem to be much more restricted or standardized.

Patterns and Motifs

There are several procedures, already implemented and applied to the analysis of patterns from other media such as pottery and textiles[52]. First, one can distinguish patterns which can be further divided from those which cannot be

48 Duru 2007, 341 fig. 73.
49 Kusmen 2007, 24; fig. 1, 3.
50 Türkcan 2007.
51 I.e. Galeria Srpske Akademije nauka i Umetnosti 1998, 442 no. 34.
52 I.e. Otto 1985.

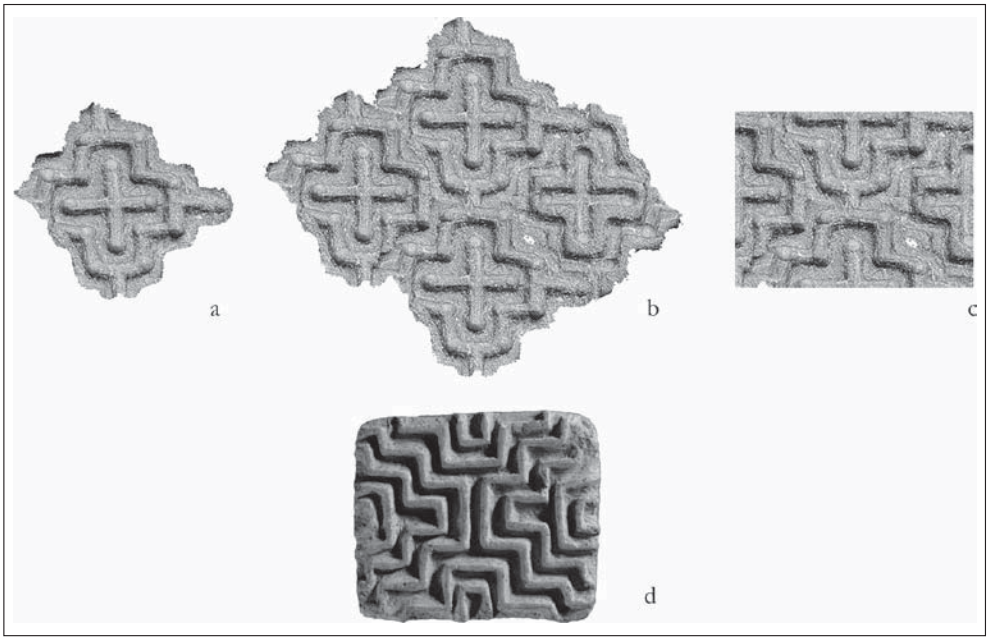

Fig. 3 Stamps from Sesklo (a) and Ulucak (d). A repetition of the motif from Sesklo arranged in a symmetric order (b and c) shows considerable similarities with the one from Ulucak (d).

subdivided, like point-symmetric patterns or single motifs or figures. Axis-symmetric or asymmetric/chaotic patterns can be further subdivided and broken down into single elements. As was to be expected, simple motifs like spirals or concentric circles are widely used[53]. More complicated and complex patterns are distributed across a much more limited area. To some extent, simple or basic motifs recur as single elements in extended patterns.

Comparing the motifs, one may conclude in general that among the southeastern European clay stamps, zigzag and labyrinth patterns predominate; while Çatal Höyük stamps predominantly have curvilinear patterns in a ›fantastic style‹. Symmetrical compositions are more frequent than basic motifs, an observation which can be made in all layers. In western Anatolia we have meander and pseudo-meander – patterns well known from Greece – but absent in central Anatolia. The connection between Thessaly and western Anatolia can be best illustrated with a stamp from Sesklo and one from Ulucak. Putting together four imprints of the one from Sesklo in a symmetric order, one gets nearly the same pattern as the one from Ulucak.

To conclude – within the area where stamps were used, Anatolia, Greece and the Balkans can be distinguished on the basis of the patterns: simple motifs occur everywhere. Taking a close look at more complex patterns, a derivation of motifs is nearly impossible.

The analysis of stamps shows quite a similar picture to that shown by the results of painted pottery analysis[54]. Beside the correspondence in the concept of using these objects and decorating pots, quite a lot of regional distinctions emerge.

It has already been shown for instance, that within various regions in Greece, considerable differences in the number of stamps can be established. Few pieces are known from the Peloponnese and Attica, whereas a significant number have been found in Thessaly. This distribution is not only due to the state of research. Focusing on other objects, a similar differentiation becomes apparent. No stamps have been found in northwestern Anatolia so far. In the early periods, painted pottery is absent in this region[55], figurines are rare and display a completely different character[56].

Neolithic Stamps within the Process of Neolithization

The ›Neolithic‹ was first employed as a technical term for the materials and tools used and worked (stone; cut stone; production of pottery). Gordon Childe placed the focus on subsistence (the appearance of domesticated plants and animals) and the socioeconomic behavior of people (i.e. sedentism). Ever since then, the term Neolithic has implied not only changes in material culture, but also subsistence as well as settlement, death rituals and sociological aspects. Jaques Cauvin[57] assumed a change in mentality and religious beliefs taking place shortly before and within the rise of the Neolithic. Beside the fact that Cauvin's assumption is nowadays an inherent part of our considerations concerning the Neolithic period, one should keep in mind the main problem with mental and religious aspects in prehistory: they cannot be applied generally, since these are very specific and linked to our point of view. Nevertheless it is nowadays generally accepted that the term Neolithic, or ›the Neolithic way of life‹, encompasses technological, economic, social and even ideological aspects as a whole.

53 Lichter 2005.
54 Schubert 1999.
55 Schubert 1999.
56 Hansen 2005.
57 Cauvin 1972; Cauvin 1994.

What Can Be Deduced about the Process of Neolithization from the Stamps?

One important observation can be made from a European point of view: the lack of stamps in the early Neolithic horizon and their appearance within the rise of painted pottery, from the last quarter of the 7th millennium BC is obvious and supports the assumption that at least two stimuli, probably from different cultural areas, reached Europe: an early one with ›monochrome‹ pottery starting in the mid-7th millennium, and a later one with painted pottery, stamps and figurines. Judging by the cultural symbols, the ideological and mental mark of the second stimulus seems to be much more intense. Probably not all regions, e.g. northwestern Anatolia and the southern parts of Greece, were influenced by this second stimulus with the same intensity, leading to a distinct cultural appearance of the Neolithic. Furthermore an overlap of drifts, the adoption, rejection or modification of cultural elements took place, creating a patchwork of Neolithic features.

One may argue that the second stimulus came from central Anatolia, where stamps were part of the cultural assemblage from the first half of the 7th millennium BC. According to this argument, one would exclude central Anatolia as a region of origin for the first stimulus, since at that time stamps were already in use. On the other hand, a different mode of diffusion, without ideological markers, might also be possible.

The comparison of patterns and motifs showed regional limitations. The same has already been deduced for the patterns of painted pottery[58]. It is no big surprise that the stamps occur in the same area where painted pottery is disseminated. The observation concerning the different layout of patterns can be interpreted as a result of local influence or sense of style. Improvements and innovations were absorbed but adapted to the local style.

The Neolithic as a whole is the result of complex interaction between the introduction of new elements and their local adoption, rejection or modification. The diffusion of technological innovations (plant cultivation and animal husbandry) from the Near East to Europe is nowadays unquestioned, but within the sphere of cognitive elements, like the ornamentation of painted pottery or the motifs of clay stamps, it is nearly impossible to detect evidence of Anatolian dependencies and the ornamentation shows an autochthonous independent development.

It has been suggested that the stamp motifs probably convey specific information, probably from specific households, but this hypothesis needs further evidence[59]. For insiders – members of a special group i.e. a lineage, or clan – such motifs might bear information, a code which cannot be understood outside the group. Jak Yakar[60] explains differences in patterns and motifs by saying the adoption of farming and the Neolithic way of life did not completely replace the traditional modes of subsistence or the local or regional subsistence strategies. Therefore it is doubtful that the supernatural world-order envisaged by earlier hunter-gatherers would have been entirely altered by new spiritual concepts. As it shown by Mihael Budja[61], the hunter-gatherer symbolic structures in the Balkans maintained long traditions, and Cauvin's »revolution of symbols«[62] in the context of the transition to farming is not a paradigm which has to be adapted to southeast Europe.

Conclusion

To sum up, pintaderas underline the fact that the Neolithization of Greece and southeastern Europe was a multilayered, complex process. A first stimulus of Neolithic elements, including sedentism, agriculture (know how, seeds, animals) and pottery reached the area in the mid-7th millennium. As it has been demonstrated by Agathe Reingruber[63] based on the evidence so far, it is unlikely that Greece had an aceramic phase.

For the moment it is tempting to link the second stimulus, the one which certainly seems to be of Anatolian origin and which took place mainly in the last quarter of the 7th millennium BC with the 8.2 climatic event[64] – and there are good reasons – first and foremost the chronology. On the other hand, one should keep in mind the ideological intensity of the second stimulus, leaving cultural symbols and mental markers, arguing rather for the strength and importance of ideology in the spread of the new lifestyle.

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58 Schubert 1999; Nikolov 2007.
59 Prijatelj 2007.
60 Yakar 2005.
61 Budja 2003.
62 Cauvin 1972; Cauvin 1994.
63 Reingruber 2008; also Reingruber this volume.
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North-Western and Western Anatolia

Evidence of Seventh/Early Sixth Millennium BC Neolithic Sites in North-Western Anatolia

by Jürgen Seeher

Introduction

This contribution was not part of the actual symposium, but is the result of an invitation to the author by Raiko Krauß. Having worked on neolithic pottery from Demircihüyük some time ago, I appreciate the opportunity to express some thoughts on the expansion and development of the Neolithic in the Sakarya/Porsuk region, i.e. the north-west of the Anatolian plateau, and the adjacent region reaching to the shores of the Sea of Marmara. Research in this area (Fig. 1) is lively and has been summarized in numerous recent publications[1]. Thus, in this paper I will concentrate on the – hitherto – earliest traces of the Neolithic in this region, i.e. the seventh/early sixth millennium BC.

The recent publications of new evidence from the area south of Lake İznik have supplied us with new information for a better understanding of what has been called the Fikirtepe Culture. Therefore, I wish to begin with a short reminder of the current state of research on this topic.

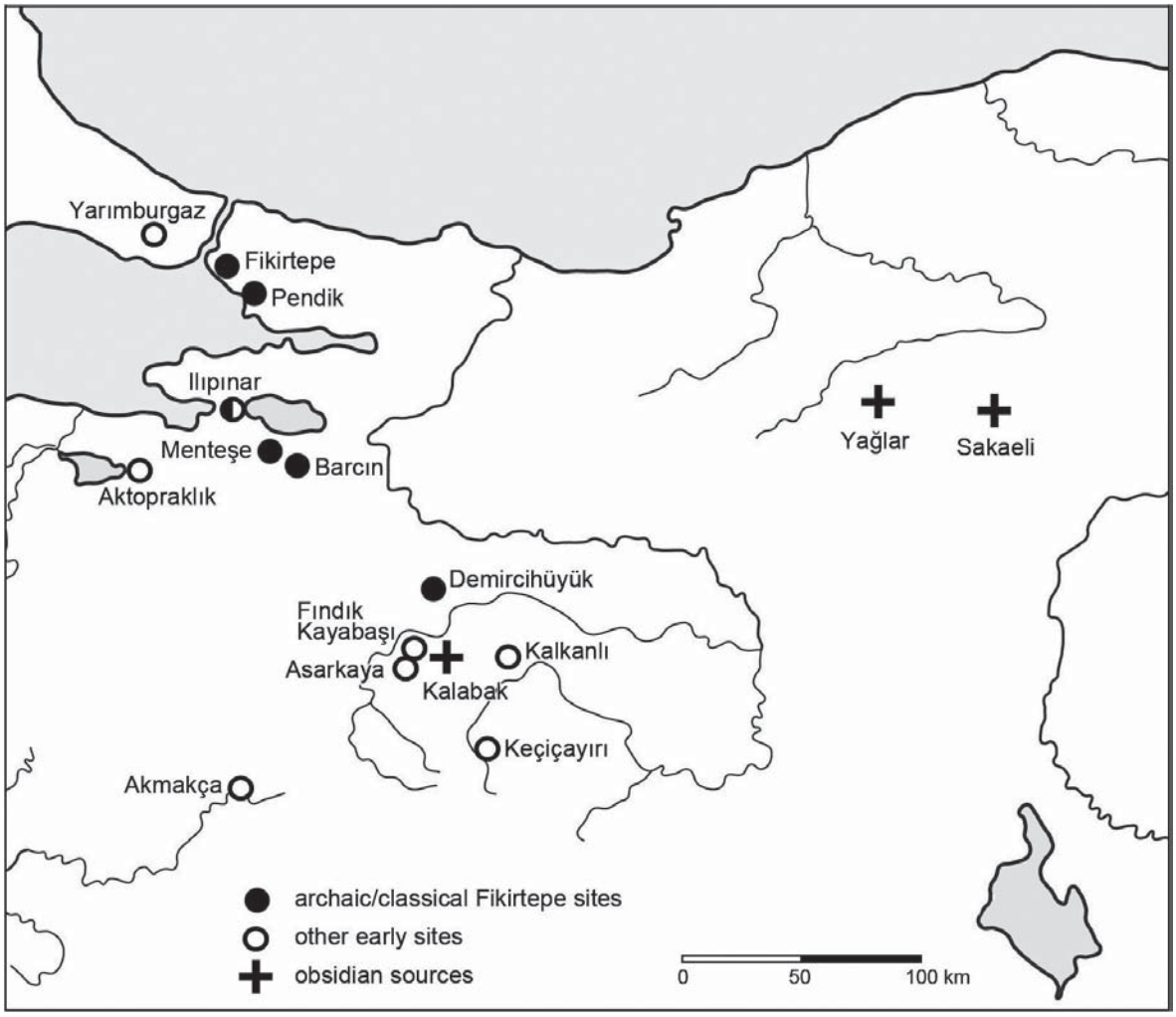

Fig. 1 Map of north-western Anatolia with sites mentioned in the text.

1 e.g.: Efe 2005; Lichter 2006; Özdoğan 2006; Özdoğan 2007; Roodenberg – Alpaslan Roodenberg 2007; Roodenberg et al. 2008; Schoop 2005; Thissen 2007; cf. also Karul, this volume.

The Archaic/Classical Fikirtepe Culture

For a long time, the sites of Fikirtepe and Pendik, close to the north-eastern shores of the Sea of Marmara, were the only known sites of the Pottery Neolithic in this region. Similar pottery shapes, including boxes with incised decoration, were excavated in 1937 and 1975–1978 at Demircihüyük on the north-western fringe of the Anatolian plateau; in addition, surveys in the area south of Lake İznik during the 1960s yielded a few similar sherds. As a result, the term ›Fikirtepe Culture‹ was introduced, but it was not more than an ill-defined catch-all for apparently related material.

In the 1980s and 1990s, various excavations north of the Sea of Marmara[2] and the excavations at Ilıpınar south of Lake İznik[3] gave a new impetus to the investigation of the neolithic expansion in North-western Anatolia and Thrace. Some of these new sites displayed a similar inventory of pottery and tools, but at the same time yielded shape variations, new decoration types and new technical elements. A more detailed classification became desirable and the terms Archaic, Classical and Developed Fikirtepe Phase were coined[4]. The Fikirtepe site comprises the two early phases, but at Pendik basically only the oldest phase is present. One of the hallmarks of these two sites is a pottery with a very typical and austere decoration with incised triangles and squares filled with criss-cross lines (Fig. 2). In contrast, the Developed Fikirtepe Phase occurs neither at Fikirtepe nor at Pendik; it was meant to include those other early sites which, among other elements, did not display the typical Fikirtepe decoration style, but rather more varied decorations and shapes. The time range for the Fikirtepe Culture – from archaic to developed – was estimated as 6200–5500 BC, with Ilıpınar VIII and Yarımburgaz 4 placed at the end of the development.

In recent years, further excavations in the area south of Lake İznik have helped to clarify the picture of an early horizon, i.e. the cultural development in the second half of the seventh millennium BC. The 3 m of basal occupation layers at Menteşe in the plain of Yenişehir represent a neolithic settlement which, according to radiocarbon datings, existed between approximately 6400 and 6000 BC[5]. The decorated pottery almost exclusively bears the typical Fikirtepe-type incised decoration with criss-cross filling. A second site is Barcın, again in the plain of Yenişehir, only a few kilometres to the east of Menteşe[6]: A date of 6440–6230 and 6240–6060 cal BC on the 2 sigma level points to the same period of time, and pottery shapes and Fikirtepe-type incised decoration underline the close relationship between the two sites. At the same time, a few box fragments decorated with incised lines and dots[7] represent a decoration not typical for the early Fikirtepe horizon. They may be interpreted as proof of a developed stage otherwise not well represented among the finds from the small excavation trench. A box fragment with incised bands filled with dots was also found at Ilıpınar level X[8].

This new evidence allows for a better understanding of this early horizon, which includes Archaic Fikirtepe Culture and Classical Fikirtepe Culture. Prior to the discovery of Menteşe and Barcın, only three sites with such material were known – Fikirtepe and Pendik, situated almost side by side in the same environment close to the shores of the Sea of Marmara; and Demircihüyük (see below), located on the north-western fringe of the Anatolian plateau, an isolated occurrence in a different environment and thus difficult to interpret. Now, however, we see that Menteşe and Barcın fill the gap between the Sea of Marmara and the rim of the plateau. We are dealing here with a genuine culture extending over a fairly wide area – the distance between Demircihüyük and Fikirtepe is 160 km as the crow flies – which includes different types of environment. The typical decoration scheme on the pottery vessels mentioned above is the hallmark of this group. I am well aware of the fact that pottery decoration should not be considered separately when postulating cultural relations. However, to my mind, this exclusiveness of decoration – on a medium and with a technique which would allow an immense variation of ornamentation – certainly does imply contemporaneity and close contact between the various groups of settlers who employed this specific kind of decoration.

At the same time it is becoming clear that the earliest levels at Ilıpınar, situated only 30 km north-west of Menteşe, represent a different stage. The early Ilıpınar pottery shape repertoire does resemble that of the other sites, but the employment of organic temper and the lack of Fikirtepe-type decoration are significant traits – only one fragment of a box from level X bears incised criss-cross decoration, but it was identified as a possible import due to its dense white grit temper[9]. The conclusion drawn by Roodenberg et al.[10], that only the oldest phase X at Ilıpınar, dated around 6000 BC, should be seen in some chronological connection with the end of the Classical Fikirtepe period, seems reasonable. We may assume with some certainty that settlements belonging to the second half/third quarter of the seventh millennium BC in the area between Fikirtepe and Demircihüyük would all display a broadly similar inventory, including in particular the typical Fikirtepe-style incised decoration on dark face burnished pottery.

At the present stage of the excavation and publication, I find it difficult to decide where the earliest phase of the site of Aktopraklık near Bursa fits in. In Layer C there are typical Fikirtepe elements, but there are also other elements which seem foreign to the Fikirtepe tradition, e.g., the red pottery sherds which are said to make up a large group in all settlement layers, or flat sided simple pots with wide flat bases[11]. Two radiocarbon dates from two burials from level C cover a range of more than 600 years (6322 ± 52 cal BC and 5692 ± 27 cal BC) and are not of much help either. The continuation of the excavation will perhaps yield the possibility for a further differentiation of the stratigraphy of the oldest layers.

2 Özdoğan 1999.
3 Roodenberg 1995; Roodenberg – Thissen 2001.
4 Özdoğan 1999, 213.
5 Roodenberg et al. 2003.
6 Roodenberg et al. 2008.
7 Roodenberg et al. 2008, fig. 6, 41. 333.
8 Schwarzberg 2009, fig. 2, 1.
9 Thissen 2001, fig. 8, 9.
10 Roodenberg et al. 2003, 37.
11 Karul – Avcı 2011, 4 and fig. 10.

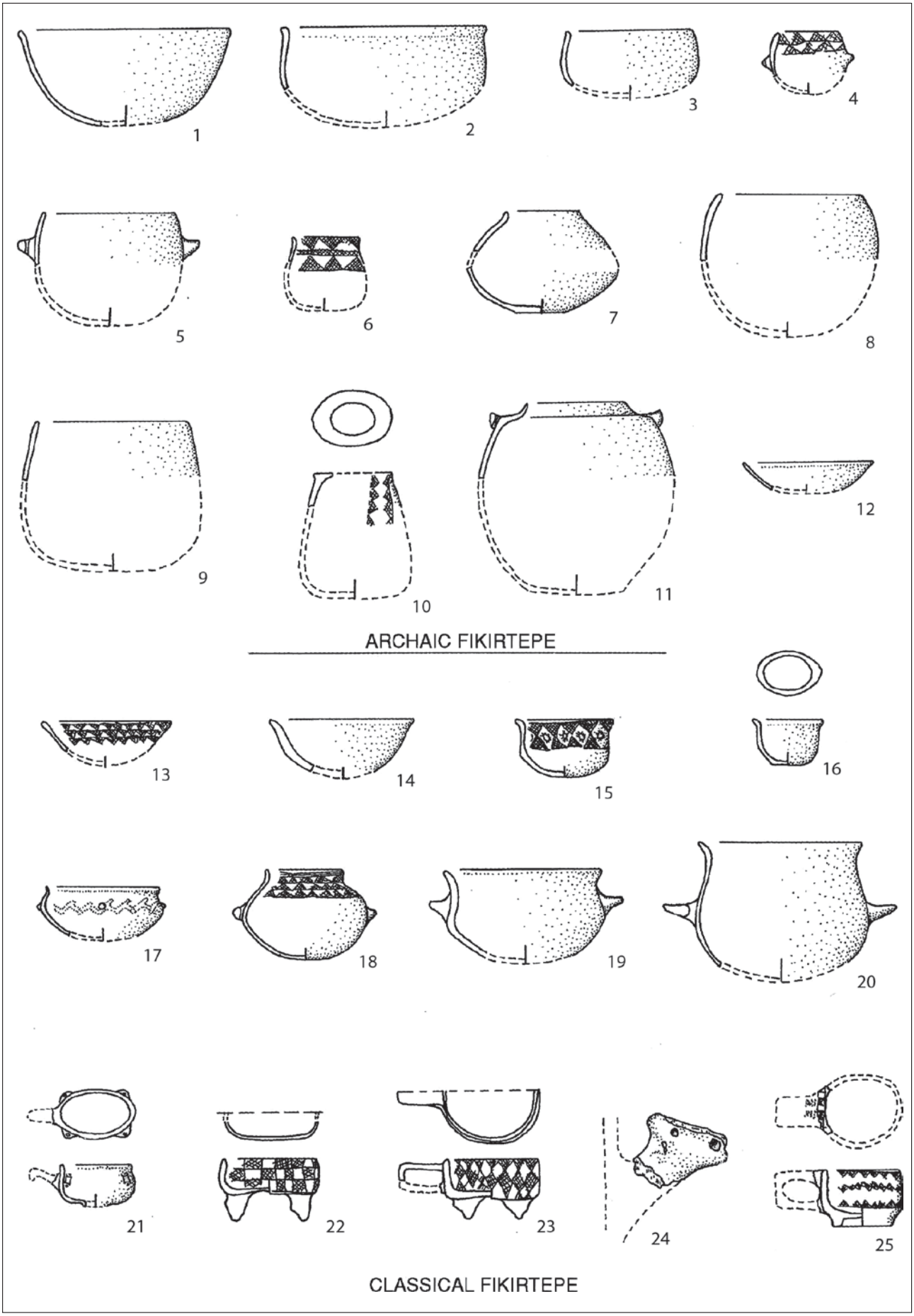

Fig. 2 Typical shapes and decorations of archaic and classical Fikirtepe pottery (after Özdoğan 1999, fig. 5).

7th Millennium BC Evidence on the North-Western Plateau

Until now, our knowledge of 7th millennium BC activities in the area has been based almost solely on finds without stratification – the material excavated at Demircihüyük on the one hand, and survey finds from various other sites, including a small sounding, on the other.

Demircihüyük, a small settlement mound in the Plain of Eskişehir, is actually a Bronze Age tell. However, the settlers used the soil of an older mound for the production of mud bricks and for various fillings. Thus their habitation layers were contaminated with tens of thousands of old pottery sherds, flint and obsidian chipped stones and other objects of stone, clay and bone. The classification of this mishmash of neolithic and chalcolithic items is still hampered by the scarcity of comparable material from other sites, but it is obvious that this is the only site in the region which has yielded ›genuine‹ early Fikirtepe Culture material. The perfect representative of this culture at Demircihüyük is Ware C[12]. This group of 416 significant sherds was separated according to its high content of crushed limestone or calcite temper, a trait which was reminiscent of pottery from Fikirtepe and which is now also observed in the material from Menteşe[13]. At the same time, the surface treatment, colour and shapes of the pottery as well as the almost exclusive occurrence of the typical decoration with incised triangles and squares filled with criss-cross lines seemed to justify a denomination of this group as ›Fikirtepe ware‹.

Similar formal elements were also discerned in Ware B, labelled micaceous ware: It contains 473 significant sherds and shows a very high content of a fine ground micaceous temper and lighter surface colours. A somewhat more restricted repertoire of shapes is obvious, but decoration includes Fikirtepe-type triangles with criss-crossing, as well as a few different examples[14]. The occurrence of a fabric group at Menteşe, where iron schists and micaceous schists are dominant (approx. one tenth of a sample of 50 sherds submitted for analysis), is reminiscent of this ware and proves that different fabrics were in use at the same time at these early sites[15]. Crushed schist was also used as temper in Ware A at Demircihüyük, a small body of 44 significant sherds consisting of a coarser fabric, usually displaying a pasty red slip[16]. The shape repertoire of this ware (Fig. 3) is restricted to hole-mouth jars with wide flat bases and flat lids (further comments on this ware below).

Wares A, B and C are each characterized by a high amount of tempering matter and by similar shapes and other technical details. This encourages the assumption that each group consists of sherds belonging to a rather short-lived vessel production. But neolithic pottery production was not standardized, and so it happened that along with such vessels specimens with less temper were also produced. Not meeting the strict criteria for our ware definitions, sherds of such ›atypical‹ vessels were counted in our study as belonging to Ware E, a fabric tempered with a ›medium amount‹ of grit. This group comprises 7231 significant sherds and shows a wide array of shapes and decoration types, also including Fikirtepe type criss-cross line decoration[17]. It is obvious that this is a catch-all group which is much less useful for chronological argumentation – a fact I should have stressed more explicitly in the publication: the occurrence of ›old shapes‹ together with later shapes in Ware E cannot be seen as proof

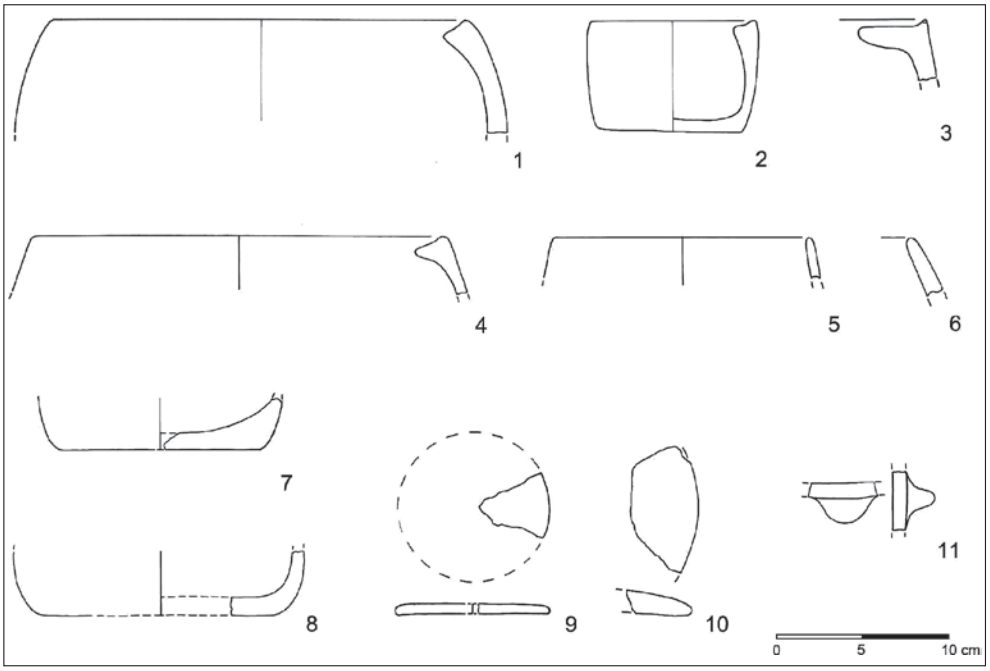

Fig. 3 Typical shapes of Ware A pottery from Demircihüyük (after Seeher 1987, pl. 1).

12 Seeher 1987, 19 f.; pl. 5–7.
13 Roodenberg et al. 2003, 29.
14 Seeher 1987, 19 pl. 1, 20–23; 2–4.
15 Roodenberg et al. 2003, 29.
16 Seeher 1987, 18 f. pl. 1, 1–19.
17 Seeher 1987, 21; pl. 10–23.

of a long period of use of this material; at the same time, however, the assumption that Wares A-E are actually a single ensemble which was in use over a rather short period only, as Ulf Schoop[18] has suggested, is equally misleading – the evidence from Fikirtepe, Pendik and Menteşe shows clearly enough that different chronological horizons can be distinguished.

More difficult than the identification of neolithic sherds is the identification of neolithic small finds and chipped stones at Demircihüyük. Bone spoons and bone smoothers seem to be most typical[19], but may have been in use over a long period of time. Among the chipped stones, long perforators on blades with steep retouch, flake end scrapers, retouched blades and bullet cores may be supposed to be early. Most certainly early are the twenty transverse arrowheads from Demircihüyük[20]; they also occur in Fikirtepe in considerable numbers. Various studies by Ivan Gatsov[21] show, however, that the chipped stone industry of the Fikirtepe horizon is not as homogeneous as might be expected.

Other evidence of 7th/early 6th millennium BC Pottery Neolithic sites on the north-western plateau is still extremely scarce and known from survey sites only. At Akmakça[22], a site almost 100 km south-west of Eskişehir in the plain of the river Gediz, a short-lived (?) flat settlement was detected. The pottery often bears a slip, and painted specimens occur. According to Turan Efe, this is the northernmost site of the neolithic culture of the Lake District currently known. Here one box fragment with typical Fikirtepe decoration seems to attest a link with the north. Another flat settlement site was detected at Fındık Kayabaşı in the Porsuk Valley some 35 km south-west of Eskişehir[23]. It has yielded a very homogeneous pottery material, perhaps single phased. The majority is of grit tempered fabric, well burnished, and usually displaying brown colours. Typical Fikirtepe-type decoration is absent, but one box fragment bears an incised decoration with lines and dots, which perhaps indicates that the site postdates the end of the 7th millennium BC.

Pre-Fikirtepe Evidence in the Northwest

The end of the Mesolithic is represented at various sites in the eastern Marmara region, namely the ›Ağaclı‹ group, dated to the 8th millennium BC. The lithic assemblages of the first Neolithic sites in this region[24] as well as south of the Sea of Marmara[25] are thought to be related to this early horizon, especially on the basis of the similar technique of bullet core reduction for the acquisition of blades and bladelets. This gives rise to speculations on some kind of population continuity/technological exchange. On the other hand, Gatsov[26] points out that this technique is also found north-west and north of the Black Sea, as well as at Hacılar and Çatalhöyük[27]. At present there is no prospect of a definite answer.

Pre-Fikirtepe sites in the Porsuk-Sakarya region are known from surveys conducted by Efe. The site of Asarkaya in the Porsuk valley, some 30 km south-west of Eskişehir, has yielded a number of flint tools – blades, end scrapers on blades, large semicircular flake scrapers with steep retouch – which leads Efe to believe »that the Eskişehir area might lie within the western fringes of the Konya Aceramic Neolithic tradition«[28]. At Kalkanlı, situated about 20 km south-east of Eskişehir, fragments of flint tools or weapons with bifacial pressure flake retouch were found which are also thought to resemble aceramic neolithic material[29]. Similar tools were also found at Keçiçayırı, a small mound on the slopes of the Türkmen Dağları close to the source of the Sakarya river, some 50 km south-east of Eskişehir[30]. During a survey, pottery sherds with pasty red slips said to be reminiscent of Demircihüyük Ware A were encountered, as well as round scrapers and pressure flaked points of flint[31]. In a small excavation in the fields beside the mound, three levels of neolithic occupation could be discerned. The two top levels contained a few sherds resembling material from the middle of the Early Neolithic as known from Çatahöyük (including a sherd from a globular vessel with ledge rim). The bottom level, by contrast, yielded only chipped stones which are said to be different from the stone tools collected during the survey on the mound itself; the latter are thought to belong to a late PPN B tradition[32]. In the 2009 excavation season, an earth filling below EBA levels was encountered which yielded a homogeneous group of sherds of the same kind of pottery with pasty red slip, including globular jars with ledge rims and large flat lids[33]. The excavator compares them to material from Demircihüyük Ware A, but also from the EN II levels of Bademağacı – some reddish vessels with ledge rims from this site certainly bring to mind the shapes of Ware A[34]. However, from the chronological point of view, Bademağacı EN II falls within the second half of the 7th millennium BC[35] and corresponds approximately to archaic/classical Fikirtepe. Together with the fact that other rim and vessel shapes are present at Bademağacı as well, the comparison of Ware A with Bademağacı EN II would imply that Ware A is in fact only part of a repertoire of contemporary materials at Demircihüyük and make the Çatalhöyük EN comparison for Ware A put forward by me earlier[36] invalid. Based on unstratified evidence only, this subject is certainly in need of further clarification.

18 Schoop 2005, 295.
19 Obladen-Kauder 1996, pl. 145–147.
20 Baykal-Seeher 1996, pl. 41.
21 Gatsov 2003a; Gatsov 2003b; Gatsov 2008.
22 Efe 1995, 107 f.
23 Efe 1995, 106 f.
24 Fikirtepe, Pendik: Özdoğan – Gatsov 1998, 212 f.
25 Ilıpınar: Gatsov 2008, 241–244.
26 Gatsov 2008, 243 f.
27 Bademağacı EN can be added: Duru 2008, fig. 223–224.
28 Efe 2005, 112.
29 Efe 1997, 221.
30 Efe 2005, 109–113; Efe – Türkteki 2007.
31 Efe 2005, fig. 8, 9.
32 Efe 2005, fig. 10; Efe – Türkteki 2007, 79.
33 T. Efe, pers. comm.
34 Duru 2008, fig. 114–115.
35 Duru 2005, 558.
36 Seeher 1987, 47 f.

When speculating about pre-Fikirtepe evidence on the north-western plateau, the chipped stone industry excavated at Demircihüyük has to be taken into account. Among the thousands of chipped stones in the Bronze Age layers, most of them relocated[37], were some flint bifacials which in all probability belong to a 7th millennium BC horizon: Large points or daggers and tanged arrowheads (Fig. 4, 6–8). The former occur at Demircihüyük with ten pieces[38]. Remains of ground surfaces on some of these pieces show that grinding was employed as a preparation prior to the final retouch. The arrowheads bear no traces of such a process, and the bifacial retouch is often incomplete (Fig. 4, 1–5).

Bifacials are typical of the Central Anatolian Neolithic, where the PPN examples show a less regular retouch than the ones from the Pottery Neolithic levels at Çatalhöyük. A comparison for the large points can also be found at Keçiçayırı, where such pieces were found in an assumed connection with sherds of a pottery with a pasty red slip. If the comparison of these sherds with Ware A at Demircihüyük is correct, the occurrence of bifacials at both sites may be grounds to assume that this coarse red slipped pottery is the oldest Neolithic pottery known so far in the north-west. Otherwise we have to speculate about a PPN phase in the old mound of Demircihüyük – a rather faint possibility. At any rate, a re-evaluation of the Demircihüyük chipped stone industry in the light of the stratified evidence from new excavations may prove fruitful and lead to the identification of other early tool types.

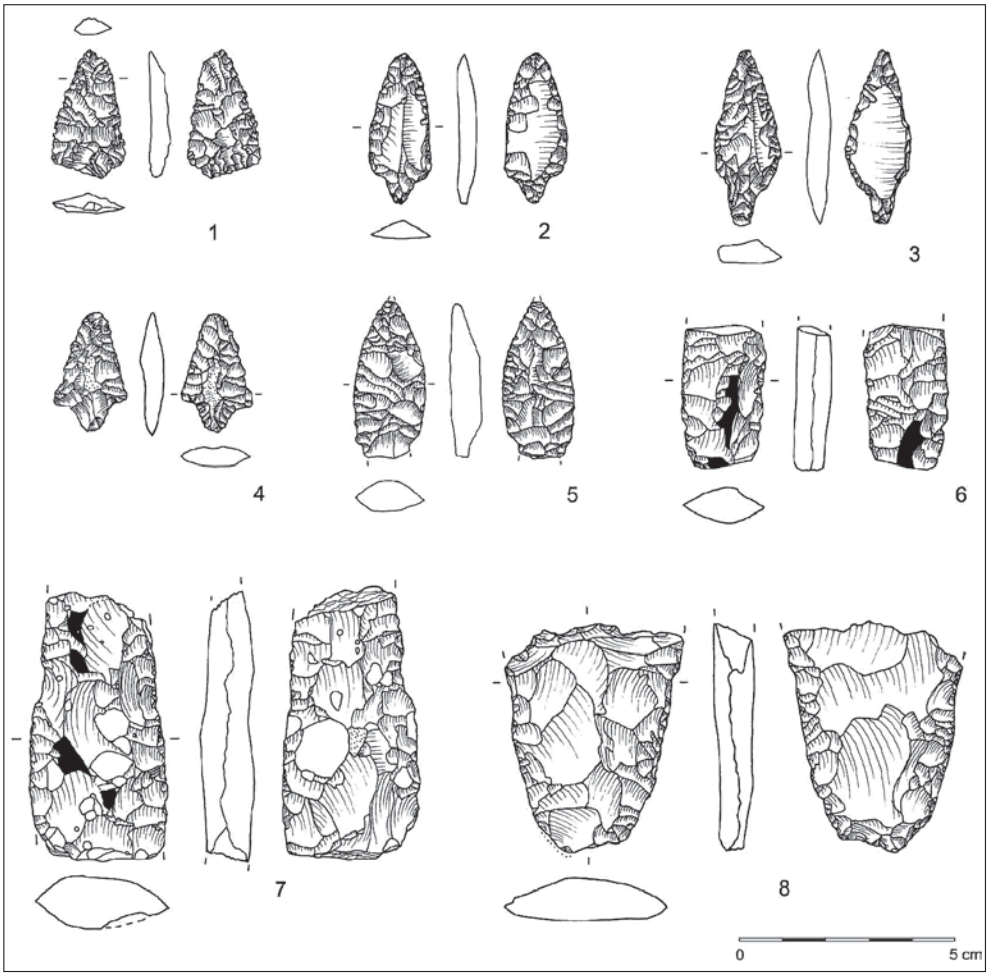

Fig. 4 Bifacials from Demircihüyük (after Baykal-Seeher 1996, pl. 42–46).

Conclusions

The reader will have realized that the sites mentioned in the text so far are virtually the same as those cited by Efe in his article on Neolithization in inland north-western Anatolia in 2005. Only Barcın has yielded an important addition to our knowledge, but no new information is available from the crucial Porsuk/Sakarya area and beyond. So, why is there so little evidence of this early period, not only in north-western, but also in central north Anatolia? Bleda Düring has recently dealt with this question at length and pointed out that a combination of reasons is likely[39]: The number and size of early sites

37 Baykal-Seeher 1996, 132–140.
38 Baykal-Seeher 1996, pl. 46–47.
39 Düring 2008.

is thought to be rather small, and the impact of erosion in this area is expected to be far greater than on the central and southern plateau. Thus the chances of locating such sites are not very high, especially in non-intensive surveys whose main focus is not on Early Holocene sites – ›you find what you are looking for‹ is a phenomenon known to every archaeologist who has walked the fields with a group of others. The fact that no early sites have yet been discovered is no solid basis for speculation about the diffusion of the Neolithic in the north-west.

This gap in our knowledge is also responsible for the fact that we still are not able to say much about the origin of the Fikirtepe Culture. The statement of Laurens Thissen[40] – »The ceramic assemblage of Çatalhöyük East does provide a remote blueprint for pottery categorization and manipulation in the Northwest« – has lost none of its attractiveness. But given the distance between the Konya Plain and the north-west – from Çatalhöyük to Demircihüyük approx. 300 km as the crow flies – one would like to know more about the ›stepping stones‹ of the expansion. At the same time, the question remains of how much influence was radiated from the early sites in the Lake District of south-western Anatolia. In his study on the chalcolithic period in Central Anatolia Schoop has pointed out the possibility of comparing decoration motifs and patterns persistent in the south and the north, despite the fact that the former preferred paint whereas the latter used incisions to adorn pottery vessels[41]. His conclusion, however, that Fikirtepe and Pendik have to be dated ›post-Hacılar II‹, i. e. post 6000 BC, is problematic and to my mind is not tenable in view of the dating evidence from Menteşe and Barcın. Furthermore, with Bademağacı EN I the dating of neolithic evidence in the Lake District has now been pushed back to the beginning of the 7th millennium BC[42]. This allows more time for the development and expansion of the neolithic way of life in western Anatolia.

The occurrence of obsidian from central Anatolia and even eastern Anatolia, as well as from sources near Sakaeli and Yağlar in central northern Anatolia, at Fikirtepe, Pendik and Ilıpınar[43], shows that contacts were maintained also with areas further afield, be it directly or indirectly. In this context, a reference to the area of Phrygia as a potential west Anatolian source of obsidian may be added: Obsidian pebbles occur in the valley of the Kalabak stream, 25 km south of Eskişehir. Thought to be the possible provenance of the obsidian found at Demircihüyük, samples from both locations were tested, but with negative results[44]. However, this source or rather this area of acid volcanism seems to hold potential for further investigations.

The radiocarbon datings from Menteşe and Barcın are the first absolute datings for actual ›early Fikirtepe‹ sites. Given the present state of investigation, it is hard to tell if both the archaic and the classical period of the Fikirtepe Culture fall within this time range of 6400–6000 BC. Given the higher frequency of typical Fikirtepe decoration in the lower levels at Menteşe, Thissen[45] suggests a date of 6400/6300 BC for ›Fikirtepe‹ (without discrimination between archaic and classical Fikirtepe). Further investigation may yield proof for this assumption, but considering the extremely restricted decoration repertoire of archaic/classical Fikirtepe pottery, it seems hard to imagine that it should have lasted for several hundred years and not undergone change in one way or the other, leading to different systems of decoration. According to our present stage of knowledge, the austere Fikirtepe-style incised decoration was abandoned somewhere before 6000 BC, giving way in the following centuries to a more varied and playful decoration with squares, triangles, staircase motifs, wavy bands etc., often filled with impressed dots. We know a whole array of such decorations from the stray finds of Ware E at Demircihüyük, but we still lack a site of the first half of the 6th millennium BC in the north-west where we can follow the development of different styles of incised decoration within the framework of an excavated stratigraphy. The term ›Developed Fikirtepe Culture‹ for this period has led some scholars to call all kinds of incised decoration ›Fikirtepe-type decoration‹. We now know better and should use the later term only for the archaic/classical period material. Eventually, new excavations will make it possible to decide if it is reasonable to stick to the term ›Developed Fikirtepe Culture‹ at all, or if another term may be more suitable to characterize the evidence.

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41 Schoop 2005, 222–224.
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The Emergence of Neolithic Life in South and East Marmara Region

by Necmi Karul

Northwest Anatolia is one of the key regions likely to provide a model for understanding processes involved in the Neolithic diffusion and its adaptation in new areas. The aim of this article is to present archaeological evidence related to the setup of the Neolithic in northwest Anatolia to comprehend the processes taking part in this drive.

As we currently know, the first Neolithic settlements in northwest Anatolia appear in the second half of the 7th millennium BC, more than one millennium later than in southeast or central Anatolia. Surface finds from the area show that the region was occupied by local Epipalaeolithic communities while the Neolithic way of life was already expanding westwards[1]. Apart from the undefined remains from Epipalaeolithic communities in northwest Anatolia, there is evidence of local hunter-gatherers in the Early Neolithic villages. In this context, changes observed in local communities and migrant cultural groups are particularly important as they point to a bilateral adaptation process.

In northwest Anatolia, the first data related to these questions was obtained at Fikirtepe, an excavation conducted in the 1950s[2]. Later on, further detail was added to our knowledge of the process by the excavations at Pendik[3], Yarımburgaz[4], Ilıpınar[5], and Menteşe[6], and the recent fieldwork at Aktopraklık[7], Barçın[8], and Yenikapı[9] (Fig. 1). The Neolithic communities in this region were dubbed the »Fikirtepe Culture« by M. Özdoğan[10] due to the distinctive characteristics that indicate their material culture followed the same path of development.

Fikirtepe and Pendik are flat settlements composed of scanty layers without clear occupation strata. Unstratified data from these flat sites were subsequently dated using relative chronology comparisons with the help of the Ilıpınar sequence excavated in the late 1980s. However, Neolithic settlements in the region are problematic because of shallow fillings in the flat settlements and changes in seashore topography due to water level rises in the Black Sea and

Fig. 1 Neolithic Sites in northwest Turkey.

1 Özdoğan 1984; Özdoğan 1985; Özdoğan 1989; Özdoğan 1999; Özdoğan 2007; Özdoğan 2008; Gatsov – Özdoğan 1994.
2 Bittel 1960; Bittel 1969/70; Özdoğan 1979.
3 Harmankaya 1982; Özdoğan 1983.
4 Özdoğan et al. 1991.
5 Roodenberg 1995; Roodenberg – Thissen 2001; Rodenberg – Alpaslan Roodenberg 2008.
6 Roodenberg et al. 2003.
7 Karul 2007.
8 Gerritsen – Özbal 2008; Roodenberg – Alpaslan Roodenberg 2008.
9 Kızıltan 2007.
10 Özdoğan 1979; Özdoğan 1983.

Sea of Marmara. Neolithic occupation at Yenikapı, which has been discovered recently at about 9 m below the present sea level[11], along with other finds coming from underground civil engineering works, provides a good example of how the changing sea level affected coastal settlements. It must also be noted here that rapid urbanization and industrialization in the Marmara region have severely damaged or destroyed undocumented prehistoric sites, thus eclipsing our broad view of settlement density and dispersion.

Before the Pottery

Despite the limited scale of evidence, finds from the region show that an Epipalaeolithic culture existed, mainly illustrated by microlithic technology[12]. Most of the material from this period is found on the Black Sea and Marmara coastlines. There are also some finds from further inland south of the Sea of Marmara. Except for those scattered locations, Ağaçlı, Dolmalı and Gümüşdere are the major sites dated to this period. The material from this area consists of geometric tools and bullet cores in a microlithic tradition.

The subsequent period is mainly documented southeast of the Sea of Marmara and in the Eskişehir region. Based on distinctive flint technology characteristics, this period is designated as the ›Aceramic‹ Neolithic Period[13]. Surface material from Çalca and Muslu Çeşme[14] in Çanakkale, and excavations in Keçiçayırı[15] in Eskişehir, demonstrate strong similarities in the lithic corpus. The main change compared to the Epipalaeolithic technology from southeast of the Sea of Marmara is the production of macro-blades. However, Epipalaeolithic lithic industry, which is still present in the pottery Neolithic Period southeast of Marmara can, perhaps, be understood as evidence pointing to the lack of an early aceramic impact. On the other hand, we must note that the places dated to the Aceramic period are not located in the lowlands but on almost mountainous highlands, which are suitable for hunting and stockbreeding rather than for farming. Thus, our limited knowledge of the highlands makes it difficult to understand the exact borders of the aceramic dispersal westward.

General Characteristics of the Neolithic Period in the Region

The Neolithic period[16] in northwest Anatolia is certainly the best studied prehistoric phase in the region. Initially, the Fikirtepe Culture was problematic due to the lack of radiocarbon dates. But later, layer X at Ilıpınar enabled us to date this culture to 6000 BC[17], followed by data obtained from the Yenişehir Plain; Menteşe and Barçın moved the date of the Early Neolithic settlements in the region back to 6400–6300 BC[18]. If we compare the data obtained from these settlements to the site of Demircihöyük[19], we see that the same cultural phenomenon ranges from the Bosporus to the Eskişehir region. The Neolithic period which starts in 6400 BC continues with some changes up to 5400 BC. This is clearly illustrated at Ilıpınar, Aktopraklık and Orman Fidanlığı[20]. Although there are some gaps in this chronology, it is possible to state that the process has a unity and continuity in itself. Whatever we call it, it enables us to define the data taken from the settlements in the region as a distinctive group from the Neolithic societies on the Anatolian plateau.

So far we have mainly focused on the data from the early phases of the Neolithic Period southeast of the Sea of Marmara. This period, which can be dated between 6400–6000 BC, reflects a relatively long time period. The same condition also applies in the area where this culture diffused. Having discovered the tell settlements inland, we can assume that the flat settlements were mainly located in coastal areas. Although it involves a much longer process, we see that there is a slow change in the pottery assemblage which is the principal element enabling us to define the culture over almost five centuries. On the other hand, in this time range, there is enough data allowing us to differentiate both the region as a non-monotonous structure in itself and, as will be detailed further, the type of adaptation process involving at least two different cultural influences.

6400–6000 cal BC: Fikirtepe, Pendik, Menteşe, Barçın, Aktopraklık, Ilıpınar X – IX

Chronology

The first stage of the Neolithic in the region can be followed in Menteşe, Barçın, Fikirtepe and Aktopraklık. The oldest known dates are from Menteşe and Barçın. The 3rd phase of Menteşe is stratified as lower, middle, and upper and dated between 6400–6100 cal BC[21]. The date obtained from Barçın is 6300 cal BC. We do not have any radiocarbon dates for Fikirtepe, Pendik, and Aktopraklık. But the material culture shows that they are contemporary with the other sites. The layer X of Ilıpınar, however, is dated to approx. 6000 cal BC

11 Algan et al. 2007.
12 Gatsov – Özdoğan 1994.
13 Özdoğan – Gatsov 1998; cf. also Özdoğan, this volume.
14 Özdoğan – Gatsov 1998.
15 Efe 2005; Efe – Tükteki 2007.
16 Which is now Late Neolithic – Early Chalcolithic in Anatolian terminology.
17 Roodenberg – Alpaslan Roodenberg 2007, 394.
18 Roodenberg et al. 2003 and personal comunucation whith F. Gerritsen (March 2009).
19 Seeher 1987.
20 Efe 2001.
21 Roodenberg et al. 2003.

and reflects the last phase of our time range. Again, the excavations still continuing in Barçın and Aktopraklık indicate that there were older phases in the region or, at least, that this period will be defined in a more detailed way in the near future.

Architecture

Although the architectural data from the oldest two phases dated to 6400–6300 cal BC are limited, the region's first architectural tradition used mud brick for building (Fig. 2a–b). There are structures with a rectangular plan, built in ›pisé‹ technique in Barçın[22]. However, we do not yet have enough information about the settlement pattern.

There is no information about the architecture in the lowest layers of Menteşe 3[23]. But the upper phases of layer 3, which are dated to ca. 6200 cal BC, are defined architecturally. The structures from these phases, as illustrated by wall construction, consists of ›pisé‹ or mud slab walls, as well as wattle-and-daub superstructures. There are also a few examples of thin wooden posts as well as imprints of wickerwork in the walls[24]. We also know that mud brick architecture was used during the same period. Although the architecture phase in Menteşe was only excavated in a narrow trench, the find gives an idea of the house plan. The architectural remains are characterized by single room structures with a rectangular plan, surrounded by courtyards[25].

In layer X of Ilıpınar, dated to approx. 6000 cal BC, the settlement pattern reflects a radial plan around a spring[26]. Although it comprised 5–6 houses in the first stage, the number (of houses) increases gradually. The buildings have a rectangular or gently trapezoid plan and consist of single rooms of approx. 30 m^2 in size[27]. In this period, different methods of construction were applied simultaneously in the same village. One type of house was constructed with rows of timber posts, set in approx. 50 cm deep ditches. The wall posts were subsequently incorporated into 25–30 cm wide ›pisé‹ walls. Big mud slabs of various sizes were used as building material. The walls were often set on a foundation of wooden boards, which sometimes covered the entire inner surface. We see that this settlement pattern and building technique continue up to layer VII.

Aktopraklık, Fikirtepe, and Pendik reflect a different architectural tradition from the inland settlements. In this tradi-

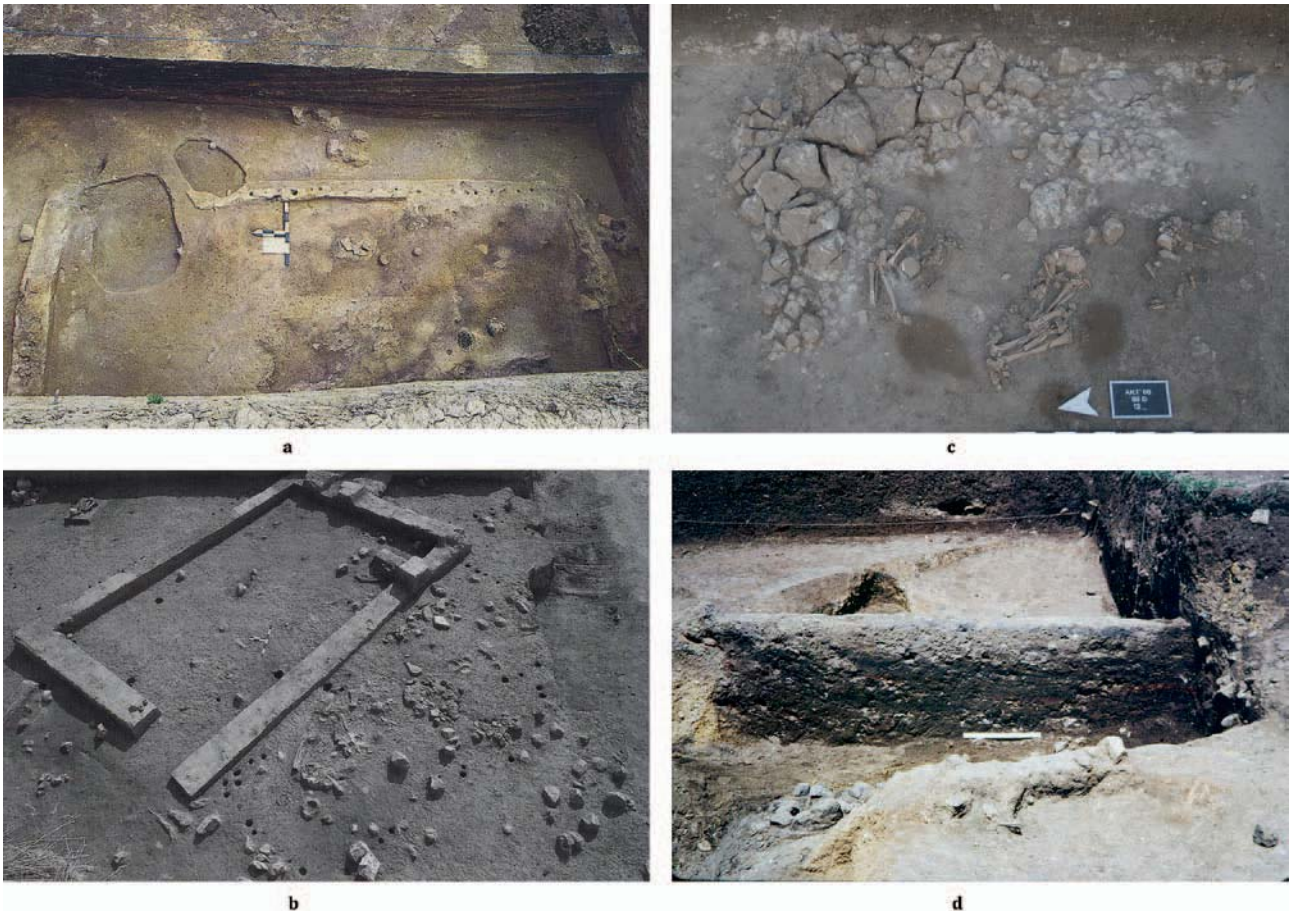

Fig. 2 Mud and wattle-daub architecture. a. Menteşe (Roodenberg 2003, 24); b. Ilıpınar (Roodenberg – Alpaslan Roodenberg 2008, fig. 11); c. Aktopraklık; d. Pendik.

22 Gerritsen – Özbal 2007, 460.
23 Roodenberg et al. 2003.
24 Roodenberg et al. 2003.
25 Roodenberg – Alpaslan Roodenberg 2007, 397.
26 Roodenberg 2008, 10.
27 Roodenberg 2008, fig. 2–7.

Fig. 3 Illustration of wattle-daub architecture from the Marmara Seacoast (Karul 2010).

tion, structures are built in wattle-and-daub (Fig. 2c – d), but the differences are not only limited by material and technique but also by plan. The structures in coastal settlements have a round plan, semi-subterranean floors, and looked like simple huts. House floors were deepened about 30 cm with sloping sides. Ovens have been discovered in some of the huts (Fig. 3). The houses were not arranged in a regular pattern, and were surrounded by open spaces with scattered fire places.

Pottery

When evaluating the pottery production, it is possible to say that there is continuity and slow change in this period, which lasted several centuries. In the first stage, the pottery has mineral temper (limestone, quartz, and mica) and black, brown, or light brown beige color with dully polished surfaces; oval bowls in S-profile are common and jugs, sometimes having a narrowing brim, are found in Menteşe, Barçın, and Aktopraklık (Fig. 4). Pots are found alongside them. There are also cult tables in all of the settlements (Fig. 5). In the following period, which is known as Archaic Fikirtepe in Pendik, Ilıpınar, Menteşe, Aktopraklık and Demircihöyük, the pottery types from the previous period continue but with an increase in diversity. In particular, surfaces begin to have duller tones of brown and red. In a few cases, fine incised decorations appear. The pottery profiles generally represent simple pots with a flat bottom, sometimes with large handles. The first new elements seen in Archaic Fikirtepe pottery have yet to be defined. Thus, it is still too early to name or distinguish the first stage as different or as the beginning stage of the Fikirtepe Culture.

Lithic Technology

In the whole region lithic artefacts display certain similarities and technology based on a mainly Epipalaeolithic substratum[28]. The index fossil is the bullet core, which is also characteristic in the previous period. But this technology also has certain similarities with central and west Anatolia[29]. Bullet cores (Fig. 6), prismatic cores, pressure technique, and direct and indirect percussion technique are the main characteristics in the region. The artifacts mainly consist of local flint and some obsidian.

Small Finds

The small find inventory consists especially of cult tables in all the settlements mentioned above. These objects generally have rectangular forms and their feet taper to a point at the bottom. Incised decorations with geometric motifs on tables are common and are also represented on the pottery, especially in the Archaic Fikirtepe phase. All settlements display sophisticated bone technology; awls, pins, spatulas, polishers, chisels and antler sockets as well as fishing hooks, and the most typical tool of the period is the bone spoon (Fig. 7). The variety and relatively large number of bone tools reflects the most distinguishing characteristics of the cultures in the region. Despite the quantity of bone tools, clay and stone finds, especially high quality finds, are few in number. They are limited to sling missiles, clay weights, some clay objects and figurines. Common features of the Anatolian Neolithic such as pintaderas, high quality beads and pendants are missing in the region. On the other hand, polished stones like celts and grinding stones are almost standard in all Neolithic settlements.

28 Gatsov – Özdoğan 1994; Gatsov 2009; Özdoğan 1989.

29 Gatsov 2009, 125.

Fig. 4 Neolithic vessels of the »Fikirtepe Culture«. a. Aktopraklık: b. Ilıpınar (Roodenberg 2003, 21); c. Fikirtepe.

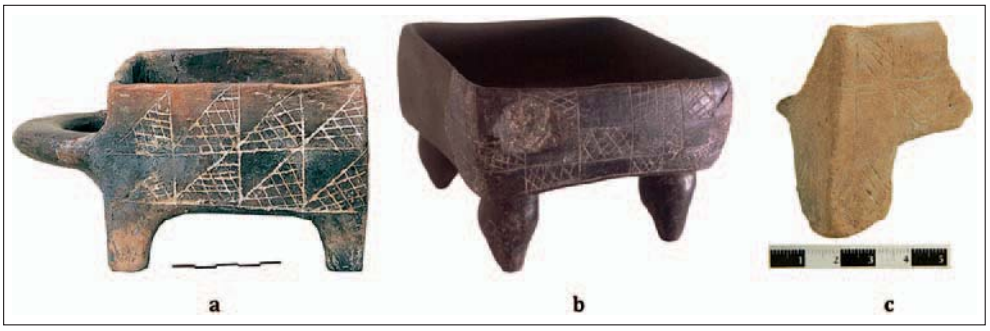

Fig. 5 Cult Tables from a. Menteşe (Roodenberg 2003, 25); b. Fikirtepe (Özdoğan 1999, fig. 31); c. Aktopraklık.

Fig. 6 Neolithic and Early Chalcolithic bullet cores from Aktopraklık.

Fig. 7 Bone spoons from Fikirtepe and Pendik (Özdoğan 1999, fig. 20).

Food Production

All settlements in the region are characterized by domesticated flora and fauna. Botanical analyses have not been conducted for all settlements; data is only available from Ilıpınar and Aktopraklık[30]. Emmer, einkorn and durum wheat (*Triticum dicoccum*, *monococcum* and *durum/aestivum*), barley (*Hordeum vulgare* and *Hordeum rachis internodes*), bitter vetch (*Vicia ervilia*), lentil (*Lens culinaris*), grass pea (*Lathyrus cicera/sativus*) and flax (*Linum usitatissimum*) were produced in the early phases of Ilıpınar[31]. Although plant remains in the coastal settlements like Fikirtepe and Pendik have not yet been analyzed, first observations of few botanical remains show the presence of already domesticated crops.

Five domesticated animals were present in the region during the Early Neolithic. The dominant species were sheep and goats, followed by pigs in the earliest phases of Ilıpınar[32]. This is in contrast to Fikirtepe, where, as far as we know, cattle were dominant[33]. On the other hand, in Ilıpınar layer IX – VII, the pig became more important, but in layer VI and V, it lost its importance and cattle became more dominant[34]. The same species were present in Menteşe, but here cattle played a more important role than in Ilıpınar, and pigs were quite rare as in Fikirtepe[35].

In Ilıpınar hunting constituted 15–22 % of the diet. In the early phases, mainly wild pigs were hunted, followed by deer species. In layer IX, cervids (fallow deer, roe deer, and red deer) became more dominant and fallow deer hunting exceeded the others, especially in phase IX where it reached a very high proportion[36]. Although the same species were hunted in Fikirtepe and Ilıpınar, their proportion is not as high as in Ilıpınar. Hunting kept playing a minor role in Menteşe as well. On the other hand, fishing and mollusc gathering occupied an essential place in the nutrition economy of Fikirtepe and Pendik. Here, there is evidence of open-sea fishing and of coastal and fresh water fishing[37]. Mollusc shells were also found in large numbers, sometimes in heaps, in Fikirtepe and Pendik. This emphasizes the importance of fishing and fishery products for coastal settlements. Molluscs also held an important place in the nutrition economy of Ilıpınar. In layer X, snails (*Helix aspersa*) constitute 50 % of the remains of this kind, as well as a small amount of sea molluscs. We see that proportions change in layer IX and sea molluscs are consumed more than land molluscs[38]. In the inland settlements, the consumption of sea products never reaches the high proportions found in the coastal settlements. The data from Aktopraklık support this statement. Molluscs gathered mostly from the rocky and sandy coastline are found only in the oldest layers of the settlement.

Burial Customs

Burials are present in all sites of the region. In the graves discovered in Barçın both children and adults are represented[39]. It is striking that the skull of one of the adults is not present in its grave. Menteşe has burial pits under the floors, but because the relationship between the graves and the floors is not yet clear, we can only state that there were intramural burials. Only one grave has two burials (female and child), the others show that the dead were generally buried individually. The skeletons were generally laid on their left side in a crouched position, and cult tables, sheep horns and scapulas were left as burial gifts.

The burial custom in the earliest layers of Ilıpınar reveals some dissimilarities. The burials were not found under house floors but outside, in an unbuilt-on area behind the houses[40]. A number of burials are concentrated in this area as in a graveyard. Small children and adult skeletons were laid in a crouched position and sometimes wooden planks lined the bottom of the graves. Burial gifts are rare and consist mainly of animal bones, seashells and occasionally pots.

30 Results from Barçın not yet published.
31 van Zeist – Waterbolk-van Rooyen 1995, tab. 1–2.
32 Buitenhuis 2008, fig. 2.
33 Boessneck et al. 1979; there is debate as to whether the cattle remains found in settlement were from domesticated animals or not.
34 Buitenhuis 2008, 208.
35 Gourichon – Helmer 2008.
36 Buitenhuis 2008, fig. 4.
37 Boessneck – von den Driesch 1979.
38 Buitenhuis 2008, fig. 13.
39 Gerritsen – Özbal 2008, 460.
40 Alpaslan Roodenberg 2008, fig. 1.

Burials in Fikirtipe occur inside and outside the houses[41]. In the burials only adults are represented, being laid in a crouched position with various orientations. There are almost no burial gifts; just one exception can be seen with the deposition of a bone spoon and a cult table with incised decoration. Burial customs at Pendik and Aktopraklık (Fig. 8) are the same as in Fikirtepe. Here also hocker burials are the main pattern, some of them being under the house floor and as in Aktopraklık, complete vessels and bone tools were buried beside the dead.

Conclusion

The elements reflecting the period until the beginning of the 6th millennium cal BC in the region still show traces of Epipalaeolithic traditions, and the first farmer communities migrating to the region settled mainly in the plains. According to their geographical situation, Barçın and Menteşe are plain settlements. Likewise Ilıpınar, which is situated just at the western end of Lake İznik is a plain settlement, too. On the other hand, Fikirtepe, Pendik, and Aktopraklık are different. Fikirtepe and Pendik are in coastal areas, while Aktopraklık is nearly coastal, but more in a foothill location.

When we compare the differences seen in the architectural tradition with the cultural data, we can reach some significant results. The architectural tradition in the plain settlements such as Barçın and Menteşe is defined by rectangular mud-brick structures. It is possible to relate this to the architectural tradition originating from central Anatolia. However, mud brick architecture was sometimes used together with wattle-and-daub, as in Menteşe and in layer X of Ilıpınar. Then it was replaced by the wattle-and-daub architecture in the later phases of Ilıpınar (VIII – VII). In contrast to the plains, coastal settlements have structures built with the wattle-and-daub technique, a round plan and an irregular arrangement. Similar customs are reflected in location choices and long-term occupation logic, plain sites taking the form of tell settlement. Aktopraklık, which we define as a tell settlement, consists of three different settlement units. The earliest site, which is named C, is dated to the end of 7th millennium and was abandoned after having been settled during several phases in the Late Neolithic Period and used as a graveyard in the Early Chalcolithic Period. In this area there are structures with a round floor plan, semi-subterranean, and built in wattle-and-daub. The same characteristics can also be seen in Fikirtepe and Pendik. We see another similarity in the duration of occupation. Both Fikirtepe and Pendik are flat settlements with a stratification of two or three phases like Aktopraklık. This characteristic also applies to other sites in İstanbul, such as the Yenikapı excavation or Erenköy and Tuzla, which are only defined by surface finds. In this context, it is possible to see that plain settlements had long-term occupation in contrast to the coastal settlements.

We see comparable differences also in nutritional customs. In spite of the limited data, plain settlements show almost the same characteristics as other farming villages known from Anatolia. Although we see the input from farming and breeding in coastal settlements, we could easily say that fishing and mollusc gathering remained dominant.

Fig. 8 Double burial from Aktopraklık.

In contrast to the other elements, lithic technology presents almost the same tradition in all settlements. But this tradition also has similarities with the Epipalaeolithic substratum in the region – showing continuity between two periods, another reason to think that the local community merged with foragers.

Despite the differences outlined above, we cannot consider the elements representing cultural unity insufficient. The finds and pottery assemblage are common to all the sites we mention here. Only a slow change in pottery assemblage can be observed during a process of almost five centuries. To a lesser degree, the same condition applies to the finds. The cult tables and bone tools are almost standard in all these sites. Another shared point in the finds inventory is that the finds like figurines are few or none, and pintadera, stone vessels, high quality beads, and belt hooks known from Anatolian villages are few or absent.

Distribution of the elements across the whole region shows that the common process started with the appearance of the Neolithic way of life. Yet the local tradition and the elements coming from the outside merged, giving the region a special character. We can say that, especially at the very beginning of the period, the societies preserved their characteristics, even if there was mutual interaction.

Mud brick architecture in rectangular plan in the plain settlements has shared features with central and western Anatolia[42]. But the main characteristics of the pottery are closer to central Anatolian than western sites. It is possible to see an analogy with the pottery having dark surfaces and

41 Özdoğan 1979.

42 Schoop 2005.

simple shapes found in layer VII – IV of Çatalhöyük[43], which is almost contemporary with the appearance of the Neolithic societies in the region. Sites like Demircihöyük or settlements known from surface materials in Eskişehir district[44], in the inner part of northwest Anatolia reinforce the ties with central Anatolia.

There was no significant influence coming into the region from the outside for about five centuries. So it is possible to interpret the cultures southeast of the Sea of Marmara as peripheral to the other Neolithic centres in Anatolia. However, we can say that from 5900 cal BC, the cultures in the region were exposed to a more remarkable change. It is believed that the Fikirtepe characteristics known from coastal settlements turned into what is called the Classical Fikirtepe phase. This change is observed largely in the pottery assemblage and is defined as an increase in the proportion of the pots of S-profile with incised decorations. And it is possible to follow this process in plain settlements in the whole area[45]. At around 5800 cal BC, with the appearance of impresso pottery, a new process began in this region, which can be followed in Ilıpınar and Aktopraklık B[46]. In both settlements the wattle-and-daub architecture was abandoned completely and rectangular mud brick structures began to be built. Because the costal settlements aren't known very well during this period, it's difficult to compare and to contrast our interpretations. Yenikapı settlement in İstanbul illustrates the change in coastal topography, as well as the industrial destruction as key factors that have prevented the settlements of this period from being recognized. On the other hand, the fact that Ilıpınar and Aktopraklık, which had different characteristics before, show similar characteristics in later phases as seen from their architecture and pottery, can perhaps demonstrate that the local societies turned completely into farmer societies or that a more dominant farming community influenced the region. The process started in this period is known so far from Aktopraklık, Ilıpınar, Demircihöyük, Yarımburgaz Cave and Yenikapı. But we see a parallel development especially in Ilıpınar and Aktopraklık up to the middle of the 6th millennium BC.

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The Current State of Neolithic Research at Ulucak, İzmir

by Çiler Çilingiroğlu

Introduction

This paper provides up to date information on the cultural and historical stages of development observed at Ulucak IV, V and VI with regards to the settlement's organization, architectural components and material culture. The results presented here should be considered as preliminary. Interpretations are based on the detailed examination of the excavation data since 1995 and on available publications by previous excavators. It is possible that future research will necessitate revisions of our current views on the settlement history. That said, we consider it important to share the most recent insights and data obtained from the excavations at Ulucak with the archaeological community. Hopefully, with the addition of future research we will be able to obtain a high-resolution picture of the life during the 7–6th millennia BC in the area.

Status of Research

Neolithic research in the vicinity of İzmir is still in its incipiency. It is a well-known fact that the mounds in the region are either inundated or buried under thick alluvial deposits that hinder detection. Despite these factors, around 30 sites have been discovered in the region and some have been excavated[1]. Ongoing investigations at Ulucak Höyük and neighbouring contemporary sites have the potential to contribute enormously to the understanding of central-western Anatolia during the Neolithic, the cultural diversity within the region, its interaction with the other regions and the way in which Neolithic life emerged in the area.

Ulucak is a multi-layered mound located 25 km east of İzmir which was discovered in 1960 by David French[2]. Excavations at the site began in 1995 under the supervision of İzmir Archaeological Museum and Altan Çilingiroğlu of the Ege University Protohistory and Near Eastern Archaeology Department. Current excavations are directed by Özlem Çevik of the University of Thrace in Edirne. Archaeozoological and archaeobotanical studies, as well as research into the lithic material from various levels at Ulucak are ongoing. Several parts of the mound were damaged before the excavations took place. Eastern and southern parts were damaged during the construction of a factory, while the western part was removed during road construction. Today the mound and its immediate vicinity are officially recognized as an archaeological heritage site.

Studies indicate that the Ulucak community during the 7th and 6th millennia BCE relied heavily on cultivation of einkorn wheat, emmer wheat, free-threshing wheat, lentil and six-hulled barley[3] as well as animal herding, dominated by sheep, goats, pigs and cattle. Wild game and marine resources played a minor role in the subsistence across Levels IV, V and VI[4]. Recent observations indicate that even the first settlers were fully-developed farmers and herders.

The occupational levels, IV and V, are distinguished by differences in building techniques. Level IV (ca. 6000–5700 cal BC) is characterized by substantial rectangular mud brick buildings clustered around open areas. The structures from level V are again rectilinear but are built using a wattle-and-daub technique which is less durable than the mud brick technique from the subsequent level. Both free-standing and attached houses were excavated.

The lithic material, usually of chert and to a lesser extent obsidian, is characterized by blade production technology typically on conical cores[5]. Neutron Activation Analysis (NAA) conducted by Ernst Pernicka of the Curt-Engelhorn-Centre for Archaeometry in Mannheim revealed that the obsidian from Levels IV and V originated from the Melian sources Adamas (Sta Nychia) and Demenegaki[6]. The fact that both levels contained Melian obsidian indicates that the exchange mechanisms operating across the Neolithic Aegean supplied the Ulucak community for centuries.

Ulucak IV–V yielded many objects considered typical for contemporary settlements, and can be defined as elements of the ›Neolithic package‹[7]. These include human (both female and male) figurines, animal figurines, polished axes, bone spatulae, ›offering tables‹, clay bi-conical sling missiles, bone needles, bone polishers, ›ear plugs‹ and clay stamps.

1 French 1965; French 1969; Meriç 1993; Lichter 2002; Caymaz 2008; Sağlamtimur 2007; Derin 2007; Horejs 2008; Herling et al. 2008.

2 French 1965.

3 Megaloudi 2005.

4 Trantaloudi 2005; Çakırlar 2008; Çakırlar 2009.

5 Çilingiroğlu et al. 2004; Çilingiroğlu/Çilingiroğlu 2007. The lithic material from Ulucak is subject of a PhD Thesis prepared by Kevin Cooney of Boston University.

6 Pernicka 2009. Ulucak team is grateful to Prof. Pernicka for the analysis undertaken on Ulucak obsidian samples. In 2000, XRF analysis made by Katsuji Kobayashi from Japanese Institute of Anatolian Archaeology showed possible presence of Göllüdağ East obsidian at Ulucak IV which, however, remain quantitatively extremely low in the overall obsidian assemblage (personal comm. K. Kobayashi). The statement in Ulucak monograph (Çilingiroğlu et al. 2004, 52) relied exclusively on the information provided by Mr. Kobayashi, which needs to be revised in the light of recent NAA results.

7 Çilingiroğlu 2005, tab. 1.

Stratigraphy and Absolute Dating

Levels IV, V and VI correspond to Neolithic and Early Chalcolithic periods. Level IV has ten sub-phases, from IVa – k, while level V comprises six superimposed building phases termed Va – f. Level VI refers to the deposits without pottery that are characterized by red plaster floors and associated architectural features. Level VI represents the earliest occupation on the mound.

In the course of excavations minor changes were made in the stratigraphic sequence. For instance, building phases published as Va and Vb in Eşref Abay's article[8] are now considered to be part of Level IV and are named Vi and Vk accordingly. Vc now corresponds to Va. These changes were made following post-excavation analysis in the light of changing architectural techniques observed in these building phases, i. e. transition from wattle-and-daub to mud brick architecture.

Currently 31 radiocarbon dates are available from various building phases at Ulucak IV – VI which present us with a coherent and reliable picture with regards to the settlement's approximate duration and chronological position. Level IVb is dated through two radiocarbon samples to 5990–5660 cal BC at two sigma (Beta-178748: 6900 ± 70 BP and Beta-178747: 6980 ± 60 BP). Levels Va – Vf, characterized by wattle-and-daub architecture, can be roughly dated to 6400–6000 cal BC on the basis of nine dates sampled variously on charred seeds and charcoal fragments. Seven recent AMS determinations date level VI, distinguished by red plaster floors and absence of pottery, to the first half of the 7th millennium cal BC.

A rough estimate of the duration of the occupation points out that the settlement was inhabited continuously for 800–1000 years prior to its abandonment around 5700/5650 BC.

Developmental Stages Observed in Levels V and IV

Comparative analysis of the ceramic material from Levels IV and V suggests four developmental phases in the assemblage at Ulucak: Late IV, corresponding to building phases IVa through IVf; Early IV, corresponding to IVg through IVk; and Level V, including sub-phases Va and Vb – f, the final two developmental phases. Va and Vb, although building phases that follow one another, are in some respects different from each other and are treated separately here. Ceramics from Vb – f show common characteristics, although detailed analysis on ceramics from Vc – Vf is still in progress (Tab.).

The aim of this schema is to allow the readers a typographic overview of the ceramic features at Ulucak through time. In terms of the ceramics stages defined here, data from phase Early IV relies on small sample size as these deposits were excavated in one grid. Moreover, they are prone to contamination. Although the contexts and quantity of pottery analyzed from Va and Vb present us with a more reliable picture, these are likewise known from restricted excavation areas (100–150 m²).

General characteristics of these developmental stages as well as information on recently exposed Level VI will be summarized below.

Building Phase VIa

Level VI is a recently defined building phase of great interest, and is currently under excavation. It is characterized by red-painted, grit-tempered plaster floors which, where they are better preserved, show two to three renewal phases, each having one cm thickness (Fig. 1). The younger red plaster floor belongs to Building 42 and has one central posthole, an oval shaped stone paved hearth and few in situ finds. Older plaster floor belongs to Building 43 which likewise contains a stone paved fire installation and a central posthole. The floor technique is similar to Building T at Aşıklı, where, for instance, similar to Ulucak, two central post-holes were identified[9].

The deposit that covers the red plaster floor is also of interest. It is composed of a sterile, brown-green, clayey soil which is around 10 cm thick. One charcoal piece from inside the clayey deposit yielded 6900–6670 cal BC at one sigma range (Beta-250265: 7910 ± 50 BP).

Red-painted plaster floors are not confined to Ulucak. On the contrary, they have a broad geographical and temporal distribution, and are mainly associated with Levantine and central Anatolian pre-pottery Neolithic (PPN) set-

Typical features	Late IV	Early IV	Va	Vb-f
Fabric	1. RSBW + CSBW 2. Impressed pottery 3. Chaff inclusions 4. Porous surfaces 5. Light surface colours	1. RSBW + CSBW 2. Impressed pottery 3. Few painted pieces	1. RSBW + CSBW 2. Appearance of impressed pottery 3. Non-porous surfaces 4. Increased use of mineral temper	1. BBW + Mica Glimmer Ware 2. Mineral temper 3. Non-porosity 4. Dark surface colours 5. No impressions
Morphology	1. Long necks 2. Small vertical handles on rims 3. Large jars 4. Flat bases 5. Double knobs 6. Thick flattened rims 7. Oval forms 8. Anthropomorphic vessels	1. Jars without necks 2. Short-necked jars	1. Bowls with 's'-shaped profiles 2. Jars without neck 3. Disc bases 4. Bowls with 's'-shaped profiles	1. Bowls with 's'-shaped profiles 2. Jars without necks 3. Disc bases 4. Long-thin tubular lugs 5. Small vessel sizes

Tab. 1 Typical pottery features of four developmental stages at Ulucak.

8 Abay 2005.

9 Esin – Harmankaya 2007.

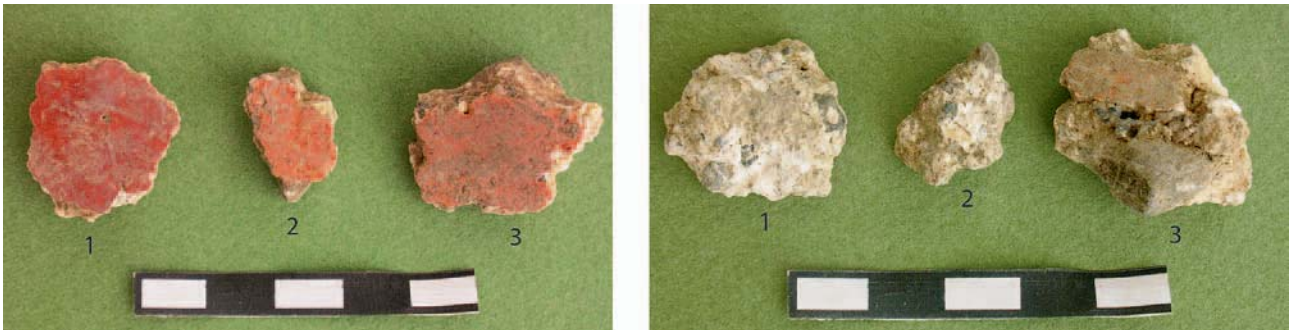

Fig. 1 Fragments that belong to the plaster floors.

tlements[10]. Aşıklı and Musular in district Niğde as well as Pınarbaşı and Çatalhöyük in Konya district contained buildings with red-painted floors which may be construed as ritual installations[11]. Such floors were also discovered at Aceramic Hacılar, Bademağacı ENI-8 and Hoca Çeşme IV in the western parts of Turkey[12]. More interestingly, floors produced with similar but less sophisticated techniques than Anatolian ones are also recorded at Lepenski Vir and Vlasac in the Iron Gates region[13] whereas there are no analogous finds in Greece and Bulgaria.

Transmission of the technological knowledge required to produce plaster floors and the application of powdered haematite to obtain the red colour in southwest Asia across many millennia is truly astonishing. It would not be out of place to note here that the modelled skulls from Ain Ghazal in Jordan are reported to contain a pink layer that was achieved by applying iron oxide to the surface of the skull model, and thus is a reflection of the same technological and symbolic practice[14]. The knowledge of how to make thick hardened floors (›terrazzo‹) produced by using sophisticated and labour-intensive pyrotechnology during the PPN seems to have been transmitted along with migrating farmers out of the core area of Neolithic. By the time of Ulucak VI, in the first half of the 7th millennium BC, the community produced conceptually and technologically similar floors. The burning of lime, mixing the substance with small grits and painting the surfaces in red were practices maintained for many millennia. By 6th millennium BC painted plaster floors were a thing of the past, a technology no longer transmitted, i. e. lost. The transmission of an old tradition like this one over such a long time scale endorses the idea that this practice had ritual and symbolic meanings and was associated with buildings that had ritual functions. The fact that red floors were finally covered with sterile soil likewise indicates the special treatment given to these buildings[15]. However, it remains unclear as to why the subsequent inhabitants at Ulucak did not adapt this practice nor bother to build structures that can be solely associated with ritual practices.

The presence of red plaster floors at Ulucak raises the question of the origins of the community who came to settle on the Nif Plain. It became clear that the settlement with these painted floors belonged to the first settlers as the virgin soil on the mound is reached during the 2011 season. However, as this practice can well be associated with central Anatolian PPN and re-occurs at Aceramic Hacılar and Bademağacı ENI-8, it seems likely that the community originated from inner-west Anatolia who upon examining the fertile Nif Plain settled here by following the east-west oriented river valleys such as Gediz and Büyük Menderes. The earliest occupation at Ulucak may have taken place as a result of a demographic mechanism called Leapfrog Colonization. Leapfrog colonization is described by Zvelebil[16] as »selective colonization of an area by small groups, who target optimal areas for exploitation, thus forming an enclave settlement among native inhabitants«. In the context of central-west Anatolian Neolithisation it is not yet clear whether early farmers settled areas which were already exploited by local hunter-gatherer groups. In order to shed light on that, pre-Neolithic, especially the Upper Palaeolithic and Mesolithic periods in the region, must be researched.

Building Phases Vb – f

These are superimposed building phases detected in Grid L13 and are characterized by free-standing wattle-and-daub houses and mineral-tempered, dark-coloured burnished pottery (Fig. 5). Red Slipped and Burnished Ware (RSBW) and Cream Slipped and Burnished Ware (CSBW) also exist in large numbers in these phases.

The only exception is from sub-phase Vd which is represented by thick stone foundations which belonged to one corner of a building. The use of thick stone foundations in this building phase contrasts with the preceding and succeeding phases. For the moment it is hard to interpret the size, function and orientation of this building.

The best representative buildings from this developmental stage were excavated in building phase Vb (Fig. 2). Three rectilinear houses with wattle-and-daub walls or post-holes were excavated. The walls are around 20 cm thick and were preserved up to 15–25 cm in height. Two central post-holes in building 30 may indicate a gabled roof. Buildings 30 and 33 held a relatively large number of storage facilities especially along their walls. These clay bins have either circular or rectangular forms. Building 30 also included large numbers of complete ceramic vessels, mainly small-to-medium sized hole-mouth jars and bowls with ›S‹ or convex profiles (Fig. 3).

10 Bentur et al. 1991, fig. 1.
11 Esin 1999; Özbaşaran 2003; Mellaart 1970, 7; Baird 2007.
12 Duru 2007, 344; Özdoğan 2007, 415.
13 Srejovic 1973, 62; Boric in this volume.
14 Griffin et al. 1998, 64.
15 See Özdoğan – Özdoğan 1998 on the practice of burying cult buildings when they are ceased to be used.
16 Zvelebil 2001, 2.

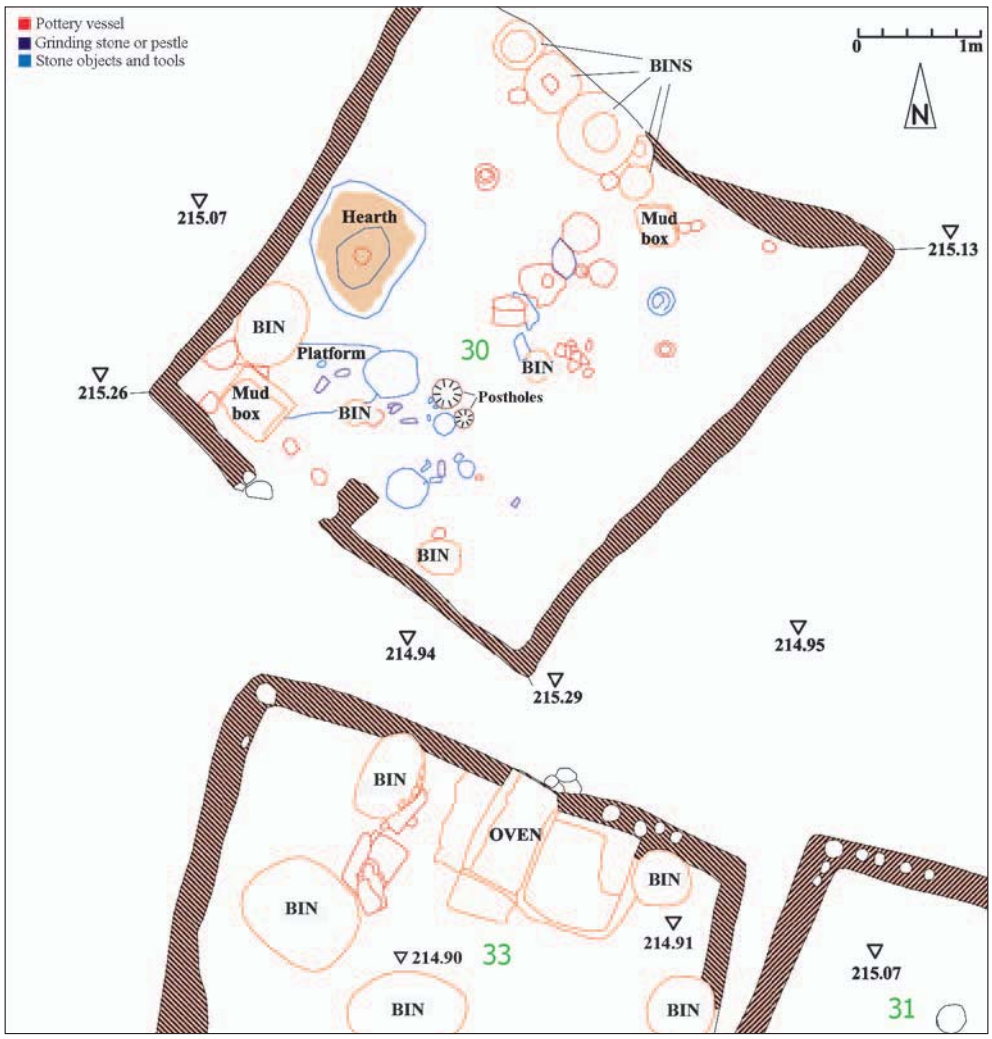

Fig. 2 Building phase Vb in Grid L13.

Fig. 3 A group of jars found in Building 30 (Vb).

The finds typically associated with these building phases are clay stamps, bone spatulae, biconical clay slings, polished axes, bone awls, pendants, three-sided polishing stones and grinding instruments (Fig. 4; Fig. 5). So far one animal figurine but no anthropomorphic figurines have been found in deposits belonging to these building phases.

Fig. 4 Typical material cultural components associated with Phases Vb – Vf.

Fig. 5 Dark colored burnished pottery (›Brown Burnished Ware‹) characteristic of building phases Vb – Vf. These samples belong to Vf.

Building Phase Va

There are two components in this building phase which differ from the previous building phases: attached post-wall houses and impressed pottery.

In building phase Va, despite the use of the same architectural techniques as previous levels, the houses are no longer free-standing (Fig. 6). This situation was observed in two separate grids (L13 and N11) and reflects a change in the settlement plan. At the moment it is not clear what may have led the inhabitants to re-organize the settlement. This may be due to change in the population or increase of the population size. In any case, following the burnt deposits of Vb, the area was levelled and attached buildings were constructed.

Va is also the phase in which impressed pottery appears for the first time at Ulucak. Simultaneously the amount of dark coloured pottery decreases and fine RSBW and CSBW increase. The forms are very similar to the ones in the previous phases, open forms with ›S‹ profiles being the most common

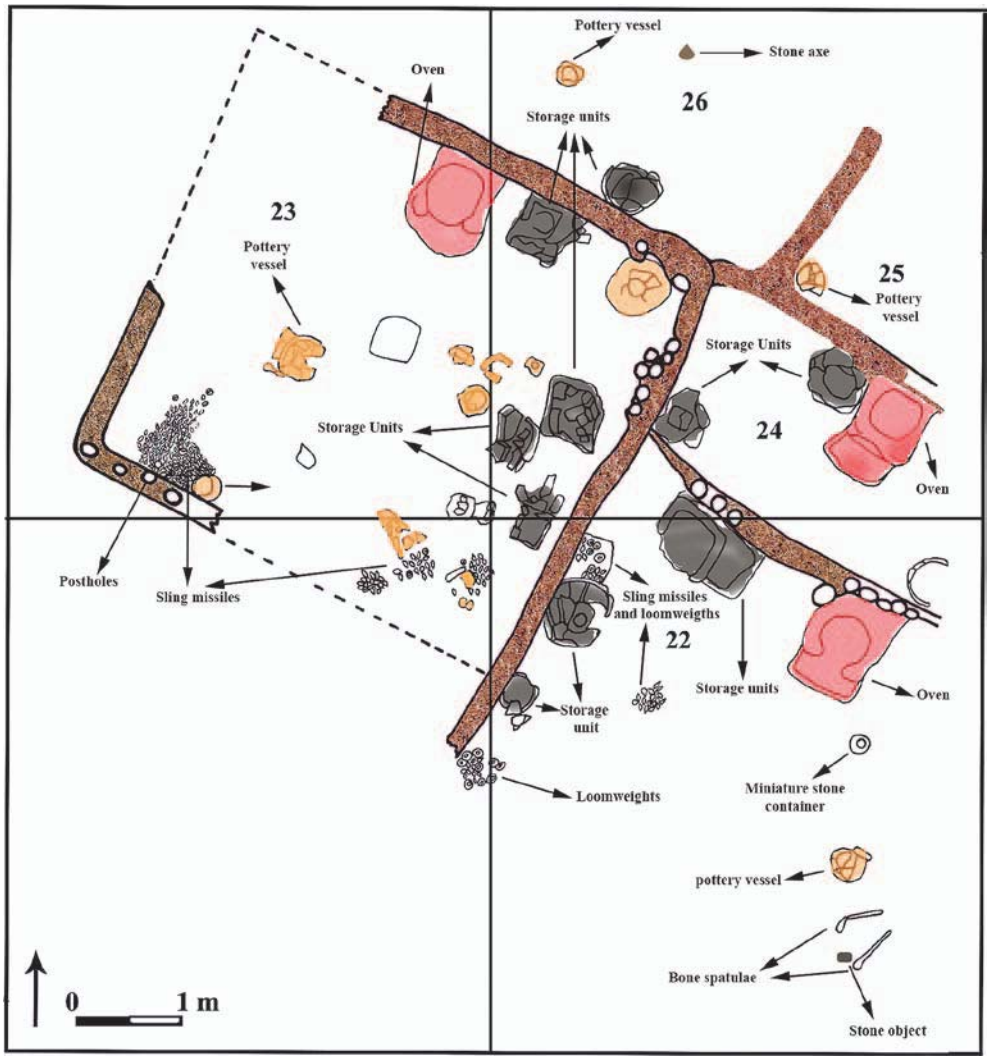

Fig. 6 Building phase Va in Grid L13.

shape. One cream slipped foot belonging to a polypod vessel was found in the fill deposits of Va.

Typical find groups are figurines, ovoid/biconical clay slings, loom weights, bone spatulae, bone awls, female figurines, animal figurines, and polished axes. The deposition of piles of clay slings in buildings 23, building 27 and building 28 are worth mentioning[17].

Building Phases IVg – k

These building phases were defined in Grid N11 and were exposed in small areas. They are characterized by thick stone foundations and mud brick superstructures. In other words, with these early building phases of Level IV, we witness the appearance of mud brick architecture on the mound. The earliest of these building phases (IVk) is represented by building 36 which has stone foundations and a paved floor. The actual mud bricks were preserved on the walls of building 34 which lies above buildings 35 and 36 and is assigned to building phase IVh (Fig. 7 and 8).

The pottery from these phases has the characteristics of Level IV, i.e. dominating RSBW together with impressed pottery and fine CSBW. Necked jars, ›S‹ profiled bowls and neckless jars occur in these phases.

One clay stamp appeared in fill deposits of phase IVg together with pieces of lithics, pottery and bones[18]. Clay sling missiles, bone awls, spindle whorls, figurine fragments and grinding instruments were unearthed from deposits belonging to IVg – k.

Building Phases IVa – f

These building phases encompass the developed stage of Level IV and are assigned to the Early Chalcolithic period in terms of Anatolian chronology. Building phases IVd – f were excavated in restricted areas and are represented by burnt floor-like surfaces and various stone foundations in a fragmental state. Building phases IVa and IVc are better defined and contain more architectural features such as activity areas, ovens and buildings in various grids.

17 Korfmann et al. 2007, 42.

18 Çilingiroğlu 2009, fig. 3, 2.

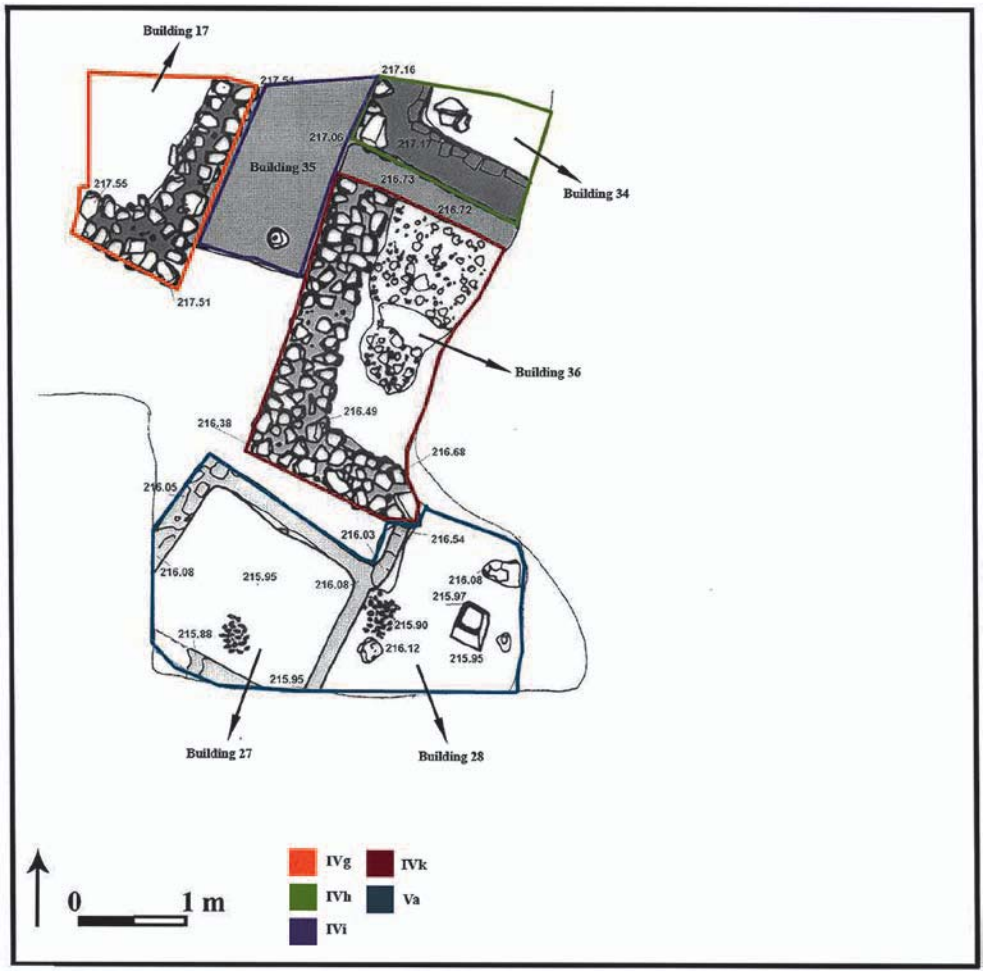

Fig. 7 Plan of building phases IVg – Va in Grid N11.

Fig. 8 Building phases IVg – Va in Grid N11 (view from East).

The best preserved and largely exposed remains are undoubtedly from building phase IVb which has already been published in several works and does not need to be repeated here[19]. The significance of this phase is its excellent preservation, which in some excavation areas has revealed mud brick walls up to 1.5 m high. However, there are still some areas where only a small part of the mud brick wall or only the stone foundations have survived. The inner architectural elements, like clay platforms, flat-topped ovens and storage facilities were also preserved inside the houses; although again, the degree of preservation differs from one excavation area to the other. Some open or lightly covered activity areas were also discovered during the excavations, such as the areas referred to as North Street and South Street. These areas contain evidence of daily activities like food preparation and tool manufacturing. At least three buildings: 5, 13 and 19, seem to have had lightly covered courtyards, which may have been used for food preparation or as penning areas.

The pottery materials show clear continuity from the previous phases but also show higher variability with regards to their morphology. RSBW is mainly chaff-tempered and constitutes 80–90% of the ceramic assemblage, whereas impressed gray wares, coarse wares and CSBW appear in much lower quantities. Ellipsoid forms, anthropomorphic vessels, small vertical handles on rims, horizontal lugs below the rim, double-knobs and large-sized storage vessels are associated with this developed phase of Level IV (Fig. 9). A few footed vessels are also among the ceramic assemblage[20].

Deposited caches with figurines[21], and activity areas such as the one in building 12 which was probably used for weaving[22] were identified during the excavations and give us a glimpse of daily life at Ulucak in the first half of the 6th millennium BC.

Biconical or ovoid clay sling missiles, stamps, various bone objects, animal and human figurines, polished axes, clay weights, blades of various size, spindle whorls, grinding stones and pestles can be enumerated among the common material cultural elements.

Fig. 9 Various lug types from IVb.

19 Çilingiroğlu et al. 2004; Derin 2005; Abay 2005.
20 Çilingiroğlu – Çilingiroğlu 2007, fig. 10.
21 Abay 2003.
22 Çilingiroğlu 2009, 14; fig. 5.

Conclusions

The lengthy sequence at Ulucak allows us to observe continuities and discontinuities in the settlement plan, architecture, material culture and subsistence patterns for 800–1000 years at a settlement located in Central-West Anatolia. This aspect is highly significant as continuous stratigraphies with such good preservation are rare in the region. It also allows us to argue that from the 7th to early 6th millennium the area experienced social and cultural stability and the Nif Plain was able to support populations who continuously occupied the mound. Not until around 5700 cal BC was the mound abandoned for a long time; an event also observable on other mounds in the entire İzmir Region. Simultaneous abandonment of Neolithic mounds in the region is a very curious issue that requires further explanation. The region-wide nature of this event makes us consider various ecological and climatic factors as possible triggers. In this respect, the 8200 cal BC event raised recently by Bernhard Weninger is of interest as it postulates sudden extraordinary climatic events across Eastern Mediterranean towards the end of 7th millennium cal BC[23]. The abandonment of the settlements in central-west Anatolia, however, does not seem to intersect with this abrupt climatic change as it occurs 300–500 years later than the 8200 cal BC event. In case of Ulucak it may make sense to suggest that the fertile soil surrounding the site became salty and infertile, and thus, not able to sustain the local population due to long-term exploitation. If we consider other co-existing farmer-herder settlements with populations relying on the same land in the beginning of 6th millennium BC, the Nif Plain may have failed to support the increased requirements of the inhabitants as a result of decreased production which might have led to social conflicts and warfare in the area. Archaeologically it is not possible to find compelling evidence for social conflict at Ulucak, except in the fierce fire that destroyed the Ulucak IVb settlement.

We pointed out above that the earliest inhabitants might have had their origins in central or inner-west Anatolia since they knew how to produce plaster floors, and they also shared common ritual practices with ancient communities in Ain Ghazal, Aşıklı, Musular and Hacılar. We indicated that Ulucak's red plaster floors were technologically compatible with the ones observed at those sites and the idea and practice were transmitted over many generations in Anatolia. The fact that such floors are not observed beyond the late 7th millennium cal BC indicates that the ritual significance as well as the know-how associated with this particular technology was lost. It is interesting to note that none of the other ritual practices encountered in the core Neolithic area, such as T-shaped pillars, buildings with extraordinary plans, modelled skulls or animal reliefs are observed in western parts of Anatolia. What could be the selective mechanism that resulted in the occurrence of red plaster floors in west Anatolia and nothing else that once existed with it?

The building with red floors was probably covered with sterile soil as it was no longer in use. Subsequent building phases on the mound did not include buildings that can be specifically attributed to a ritual function, either in plan or in contents. Nevertheless some caches and depositions inside the normal houses from Level IVb can be associated with ritual practices.

Following level VI we observe free-standing post-wall buildings which are associated with dark coloured pottery, RSBW, CSBW as well as familiar Anatolian Neolithic finds such as stamps, slingshots, bone spatulae etc. With building phase Va, the houses are constructed adjacent to each other and impressed pottery makes its appearance.

Level IV is characterized by rectilinear mud brick houses with or without courtyards. Early IV phases (IVg – k) represent the transition from Late Neolithic to Early Chalcolithic at the site during which RSBW shows a gradual and steady increase. In late IV, especially in the well-preserved phase IVb, houses contained clay platforms, flat-topped ovens and fire installations. RSBW with flat thick rims, large storage vessels, long-necked jars and anthropomorphic vessels are among the typical components of the ceramic assemblage. Interestingly, no human burials have been discovered at the settlement so far.

It is our hope to integrate the continuing research at the site with the data already available and present the new insights to the archaeological community for further discussion. It is highly likely that the schema presented here will be modified as new information becomes available. It may not be fully correct to apply the developmental scheme we observe at Ulucak to the whole region, but at least for its immediate vicinity, Ulucak provides us with information on the long-term development during the 7–6th millennium BC and helps construct relative chronologies which the region is desperately in need of.

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Environmental Factors in the Neolithic Settlement of Ege Gübre

by Haluk Sağlamtimur

In recent years, excavations carried out in western Anatolia and the Aegean region such as Ulucak, Yeşilova, Dedecik-Heybelitepe, Çukuriçi and Ege Gübre have provided crucial information about the Neolithic process in western Anatolia. Current discoveries indicate a new region of Neolithic development in western Anatolia. There is no doubt this new development region has links with central Anatolia, but the evidence shows that coastal interaction was also evolving on the Mediterranean and Aegean shoreline, independent from central Anatolian influence[1].

Ege Gübre Neolithic Settlement

The Neolithic settlement of Ege Gübre is located on the grounds of the Ege Gübre Factory near Aliağa[2]. The settlement lies to the east of a bowl-shaped area with a diameter of 2–3 km encircled by hills, 1 km from the sea (Fig. 1). As we know today, the sea level reached the existing level on the Aegean coasts following the Last Glacial Maximum, around 4000 BC[3]. The settlement in Ege Gübre began by the end of the 7th millennium BC; therefore the distance between the sea and the settlement was probably different than it is today, and the site was located further inland. In the area where it is not possible to observe any trace of habitation, the settlement dated to the Neolithic Period lies three or four meters beneath the modern surface of the surrounding fields. This indicates that most of the Neolithic settlements were covered by alluvial filling, as a result of the peculiar geological nature of western Anatolia. Because of the accumulation

Fig. 1 The site of Ege Gübre. The archaeologicaly excavated area is marked with a red arrow.

1 Özdoğan 2007, 447.

2 A team directed by Turan Özkan, the former principal of the İzmir Museum, and Sebastiana Lagona carried out excavations at the site in 1994 and 2000. Because of this, the archaeological remains dated to the Neolithic Period have been well known for a long time. Some of the soundings in various areas included the sections we have been excavating. We would like to thank to them and their reports determining this area as a Neolithic settlement and a place that has to be researched in detail. Salvage excavations were conducted by the Museum of İzmir and Ege University, Faculty of Letters, Department of Archaeology, between 2004 and 2008.

3 Kayan 1999, 544.

of dense alluvial fillings during the Holocene in most parts of the region, particularly in the lowlands[4], discoveries of Neolithic settlements, especially on river banks and coastal plains, owe a lot to chance, as was the case in Ege Gübre (Fig. 2).

The strata dated to the Neolithic (Fig. 3) from latest to the earliest is listed as,

- Ege Gübre III – a
- Ege Gübre III – b
- Ege Gübre IV

The majority of the findings unearthed in the settlement belong to the III – a and III – b phases. The earlier phase, architectural layer IV, was mostly destroyed by III. The carbon analyses from both strata indicate a time span between 6230–5880 BC.

Fig. 2 Alluvial filling over the Neolithic settlement at Ege Gübre.

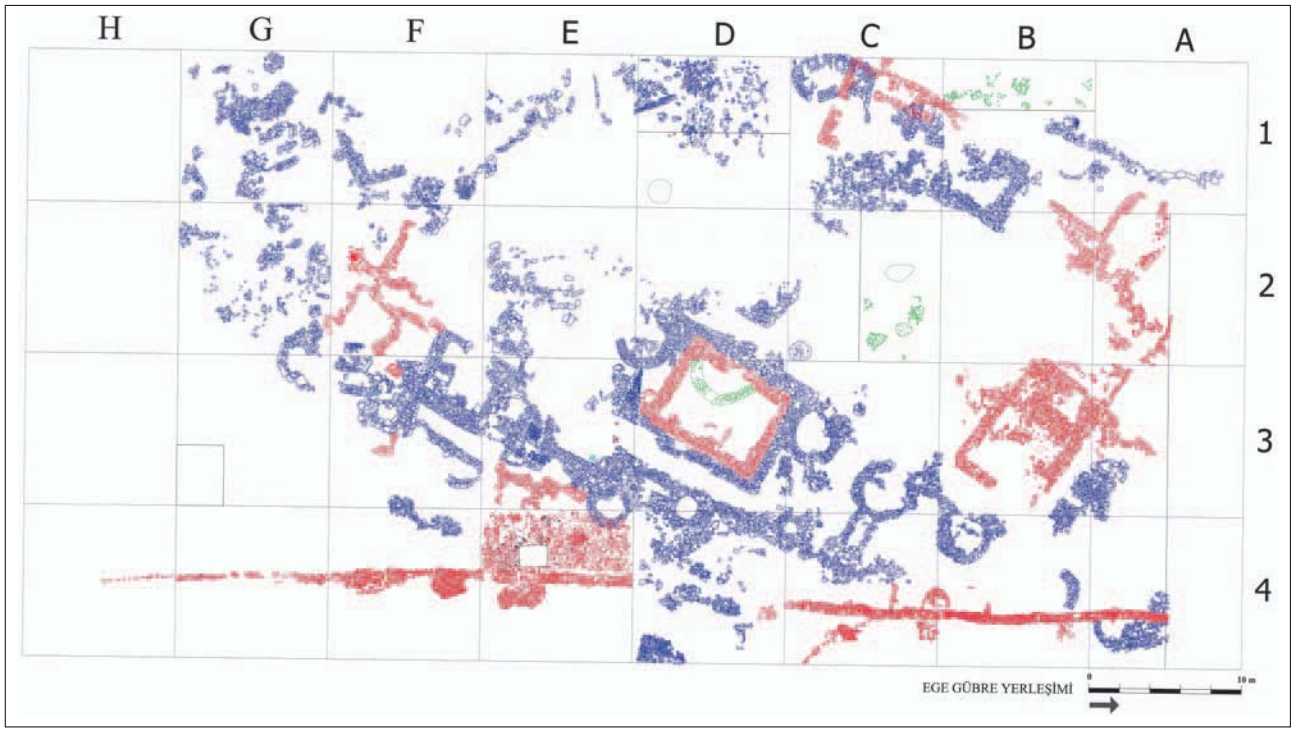

Fig. 3 Map of the excavated area.

Architecture of III – a and III – b Building Levels

In these phases, circular and rectangular structures surrounding a central courtyard have been unearthed (Fig. 4). In total, seven circular and eleven rectangular structures from the Neolithic period were uncovered. The rectangular buildings have various dimensions. While the larger structures used in III – a and III – b phases measure nine to seven meters, the others are smaller. One can see that there are two types of rectangular structures: some with small secondary rooms, and some containing a single room. The circular structures were mostly discovered on the south-eastern part of the mound. These have a wall thickness of 70 to 80 cm, and a diameter of four meters. The lack of hearths or any other architectural elements in these buildings indicate that these were not separate housing structures, but were used for storage for the rectangular dwellings. The floors were plastered with daub. The entrances of the rectangular structures open onto the central courtyard. There are no traces of mud brick superstructures on the walls. The nature of the stone foundations suggests that the walls were built in the wattle and daub technique. That is why the walls do not have standard thicknesses, and some flat stones were regularly placed on the walls for the beams bearing the roof. The space between the beams was

4 Brückner et al. 2005, 95–106; Brückner et al. 2006, 63–83; Hakyemez et al. 1999, 549–554.

Fig. 4 Excavated Architecture from Ege Gübre III – a and III – b.

filled by wattle and daub. In some of the rectangular dwellings, one or two hearths were discovered. No fireplaces have been found in the circular chambers. Compared with the hearths unearthed inside the rectangular structures, an unexpectedly large number were unearthed in the courtyard around which the dwellings were arranged. This courtyard in the middle of the dwellings comprises an area of approximately 600 m^2. The spaces between the buildings show that the settlement was not designed according to a coordinated plan. These gaps can be regarded as streets. These are generally in the area between the space behind the surrounding wall and the stream to the north-east of the site. Because the courtyard has a slope in the north-west, the entrances to the buildings here have one or two stepped thresholds.

Architecture of Building Level IV

The earliest building level dated to the Neolithic period is level IV. Because of the destruction caused by level III, archaeological data from the fourth building level is scarce. The architecture of this level is circular. The partly-preserved circular structures with a diameter of five meters, destroyed by the large rectangular buildings of level III, verify that in the earlier phases the circular plan was used separately, independent from the rectangular ones. Despite the archaeological work carried out in various sectors, no architectural remains dated to the same phase have been unearthed. As in the succeeding phase, the circular structures must have surrounded a central courtyard. The position of the central courtyard is likely to have been roughly the same in both phases. The hearths of the earlier phase are simple fire-pits, dug directly into the soil. Carbon samples obtained from hearths right above the virgin soil give the year 6230 BC as the earliest date for the settlement. The circular structures seen in the earlier phase of Ege Gübre Neolithic settlement are similar to the circular structures in Hoca Çeşme IV and III[5]. This architectural tradition is a new one, which is not known from the other Neolithic sites excavated in the İzmir region.

Geographical Features of Ege Gübre and its Environment

During the excavations, a team led by İlhan Kayan from the Ege University conducted geo-morphological searches and soundings in and around Ege Gübre settlement. According to these studies, no deltas were formed on the coast due to the seasonal flow and narrow catchment of the Hayıtlı Stream, running to the east of the settlement. That is why most of the alluvial deposits carried by the stream could not reach the coast, and were left within the settlement boundaries. The soundings detected a prehistoric lake to the west of the settlement, 13 meters underneath the modern surface. The hilly topography surrounding the settlement area also ensured the accumulation of alluvial filling. This led to an alluvial deposit of 5.5 m on the site, reaching a depth of 13 m on the western part of Ege Gübre, from prehistoric times up to today. The absence of archaeological material in the 13 m sounding obtained from the prehistoric lake shows that the settlement never expanded in this direction. Thus, the dwellings of the settlement lined up within the area between the shores of this small lake and the Hayıtlı Stream. With the rise of the waters of the lake to the west of the settlement, the habitation area must have gradually shifted to the east, closer to the Hayıtlı Stream. Despite the expansion of the site to the east, we can assume that the dwellings in this part were also threatened by the stream. The earlier phase of the two-phase surrounding wall (Fig. 5a – b) built on the eastern side of the settlement was not meant to restrain floods from east. This wall has the features of a surrounding wall, hedging the village. Also, the towers on the wall were built for entrance

5 Özdoğan 1998, 70 fig. 1; Özdoğan 1993, 185 f.

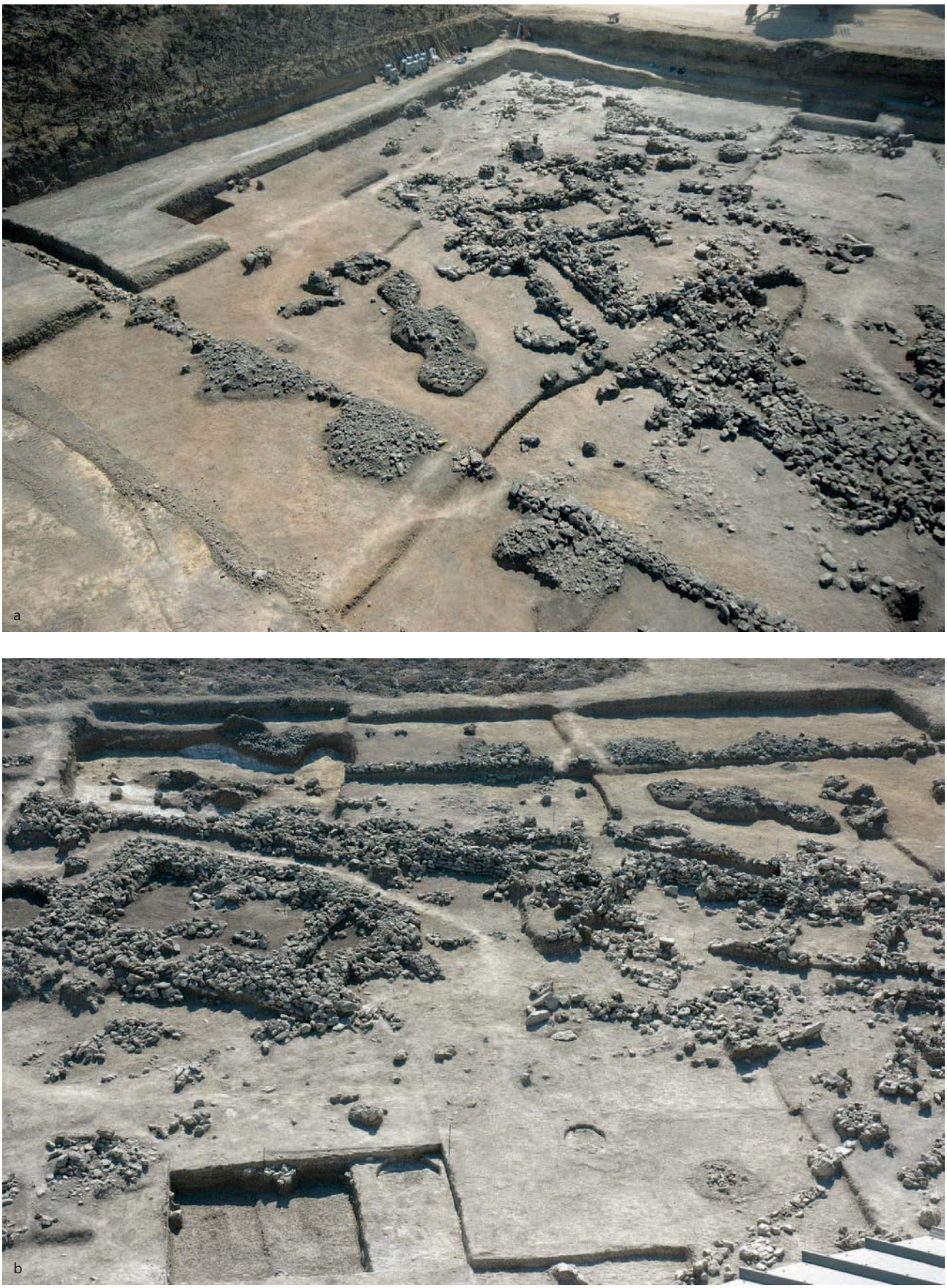

Fig. 5a – b Overview over the settlement with the surrounding wall in the foreground (a) and background (b).

to the village from this side, as in the XI building level of Kuruçay[6]. The second surrounding wall, with a length exceeding 70 m was built in phase III – a. It was constructed far from the dwellings, and was much smoother, with a single row of stone. Due to the destruction caused by the overflows, the wall was renovated in different periods. The sand deposits unearthed in this area show that the stream occasionally threatened to flood the settlement (Fig. 6). Because of this threat, the space between the first and the second wall was left nearly unoccupied and areas closer to the stream were not inhabited. The gateway with a width of 70 cm must have been used to get fresh water.

The environmental features mentioned indicate the basis of the economy during the Neolithic period in Ege Gübre. The changes in sea level during Early and Middle Holocene between 15.000 BC and 4000 BC[7], and the geo-morphological developments determined the choice of settlement location. Shifts in the sea level shaped maritime communities, which derived benefits from the sea, but other settlers kept away from it[8]. Ege Gübre settlement was chosen because it was between a lake and a fresh water source. It has to be noted here that in the latter phases, especially in the Chalcolithic period, the settlement expanded inlands, to the east, instead to the north, where the sea was. The evidence of sea products indicates that the Neolithic population made great use of the sea as a source of food. Some of the sea products are univalve or bivalve molluscs which can be found in shallow waters such as inlets or lagoons. The lagoon cockle (*Cerastoderma glaucum*)[9], common murex snail (*Hexaplex trunculus*) and mediterranean mussel (*Mytilus edulis*) are the most common species, followed by the european oyster (*Ostrea edulis*) and spiny oyster (*Spondylus gaederopus*). Although less frequent, some specimens of hornshell (*Cerithium spondylus*), limpet (*Patella spondylus*), and topshells (*Monodontinae*) were also found. The density and the taphonomic status of the mollusc remains indicate that the shellfish were collected from the closest shores and utilised at the site.

Ege Gübre settlement and its vicinity are in the Mediterranean climate belt. Hot, dry summers are followed by warm and rainy winters. The average temperature is between sixteen and eighteen degrees Celsius. Average rainfall varies between 600 and 800 mm. Nearly all the streams close to the settlement are seasonal and the catchment basins are fed by small runlets. The earth found in and around the settlement is formed by brown alluvial deposits without any marl. One can easily say that the environmental and climatic circumstances here were appropriate for a community dealing with agriculture and animal breeding. The natural structure of the vicinity is formed by agricultural lands and pastures. Menemen Plain, covered by the rich alluvial deposit carried by the Gediz River[10], indicates the substantial agricultural potency in the region, especially on the southern part of Ege Gübre. Lentil, wheat, vetch and chickpeas are the food plants found during the excavations. Numerous grindstones and pestles found with straw remains show that the seeds were treated in different ways within the site. Nearly all of the ground stone tools were unearthed in the workshops for these processes, in the courtyard. The animal bones put sheep and goats at 55 %, followed by 25 % cattle and 20 % pigs. Again, nearly all of these animal bones belong to domesticated species.

Fig. 6 Sand deposits at the surrounding wall.

The settlement is located in volcanic terrain. Thus, the landscape surrounding the village supplies huge amounts of flint. Çakmaklı Village, very close to the excavation site, and the hills of Karaçakmak and Akçakmak to the south-east of the settlement, are likely sources for this material. Findings from the excavation support this notion, for the utilisation of flint is around eighty percent.

Conclusion

The circular structures unearthed in Ege Gübre and Hoca Çeşme exhibit a totally different tradition when compared to the rectangular, mud-brick structures with stone foundations known from central Anatolia. The existence of close parallels of these circular structures in Cyprus[11] and Thrace (such as Hoca Çeşme) suggest a third formation region different from the central Anatolian and Near Eastern Neolithic. It is clear that the maritime effect on the common Neolithic cultural elements, beginning from the Levantine region and seen in Cyprus, the Eastern Mediterranean, Aegean coasts and Crete, is no less important than the overland cultural interaction. Further research into the artefacts will improve our understanding of the Neolithic period in western Anatolia.

6 Duru 1994, 11 f.; fig. 1; tab. 15.
7 Kayan 1991, 543–548.
8 Stewart – Morhange 2009, 401 f.
9 The terminology on the molluscs was reviesed by Canan Çakırlar. For the content, however, the author is responsible (R.K.).
10 Hakyemez et al. 1999, fig. 1; 551 f.
11 Steel 2004, 50 f.

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Çukuriçi Höyük – Various Aspects of its Earliest Settlement Phase

by Alfred Galik – Barbara Horejs

Prehistory in the Ephesos Region

Western Anatolia and especially the region of İzmir have recently attracted considerable attention in prehistory after decades of almost no interest in this field by archaeologists. While central, southern and eastern Anatolia as well as the entire Aegean area and southeast Europe belonged to the core of prehistoric archaeology, western Anatolia remained

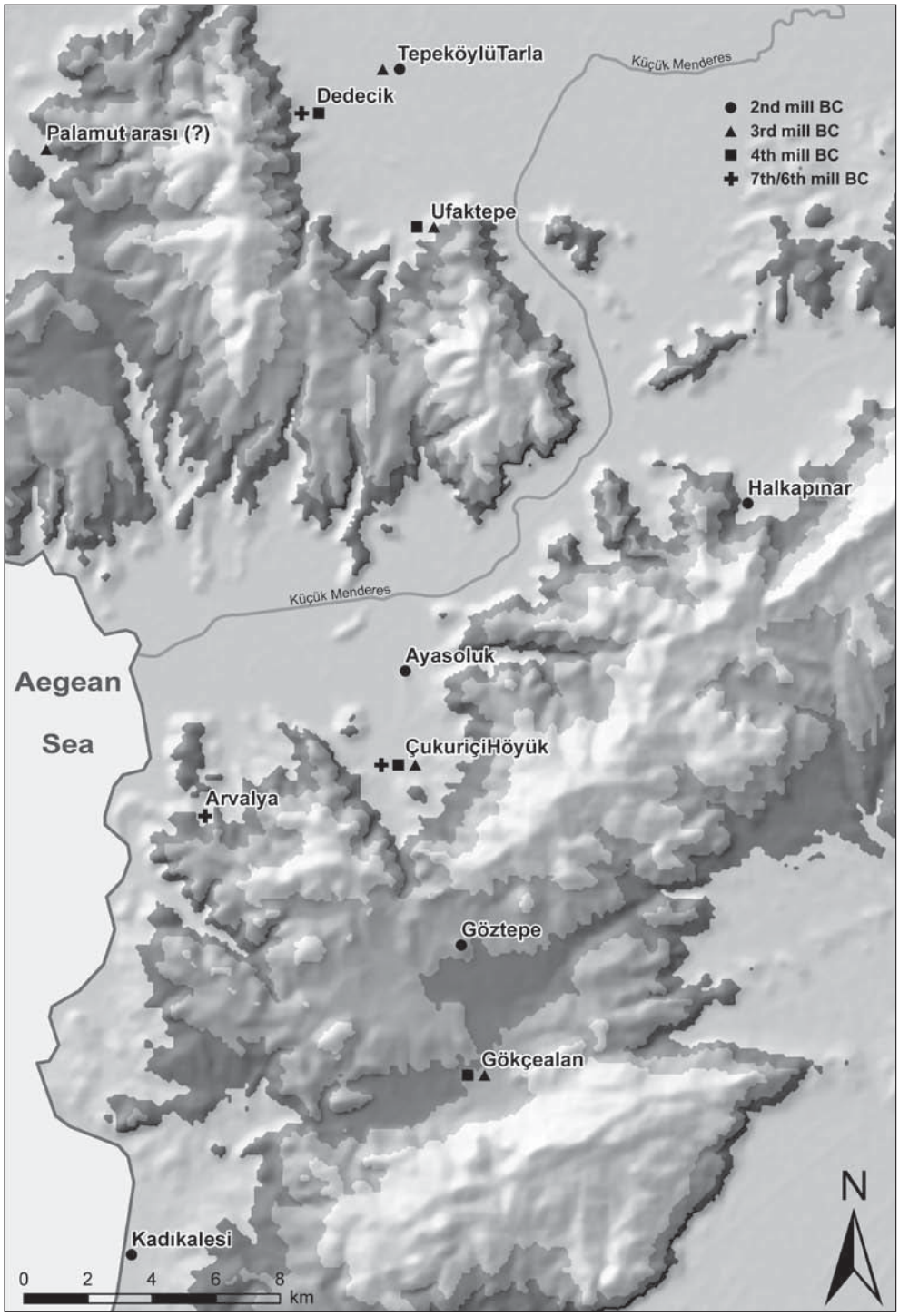

Fig. 1 Prehistoric sites in the lower Küçük Menderes region in chronological differentiation (after Meriç 2009 with additions). Map by B. Horejs and Ch. Kurtze.

at its periphery[1]. For the last two decades the picture has gradually changed regarding the coastal area due to new investigations conducted by different research teams from the Çeşme peninsula down to the region of Didyma[2]. Archaeological research at the central Anatolian coast has traditionally focused on the famous cities of Antiquity with their well-preserved Greek and Roman ruins like in Ephesos, where the Austrian Archaeological Institute has been excavating for more than 100 years. As in many other antique centers on the central coast (e.g. Pergamon[3]), only the historical periods have been systematically and intensely investigated, leading to a fragmentary knowledge on prehistory in general.

During extensive surveys by Recep Meriç in the 1980s in the region of the Küçük Menderes (Kaystros) valley, surface finds and sites of different periods including prehistory were collected and recorded[4]. Based on his recently published results, which were completed by rescue excavations by the local museum in Selçuk, the present picture of prehistory in the region might be summarized in the following way (Fig. 1): Almost half of the prehistoric sites located at most 15–20 km out of Ephesos date to the 2nd millennium BC (Middle and Late Bronze Age) as seen in Halkapınar (excavated)[5], Ayasoluk/Artemision (excavated)[6], Göztepe (surface finds)[7] and Kadıkalesi/Anaia (mixed deposits)[8] south of Küçük Menderes and Tepeköylü Tarlası (surface finds)[9] north of the river. Another five sites can be dated in Late Chalcolithic and/or Early Bronze Age periods (4th – 3rd millennium BC)[10]: Gökçealan (surface finds)[11], Ufaktepe (surface finds)[12], Dedecik-Heybelitepe (excavated)[13] and possibly Palamut arası (surface finds)[14]. Finally, two Late Neolithic/Early Chalcolithic

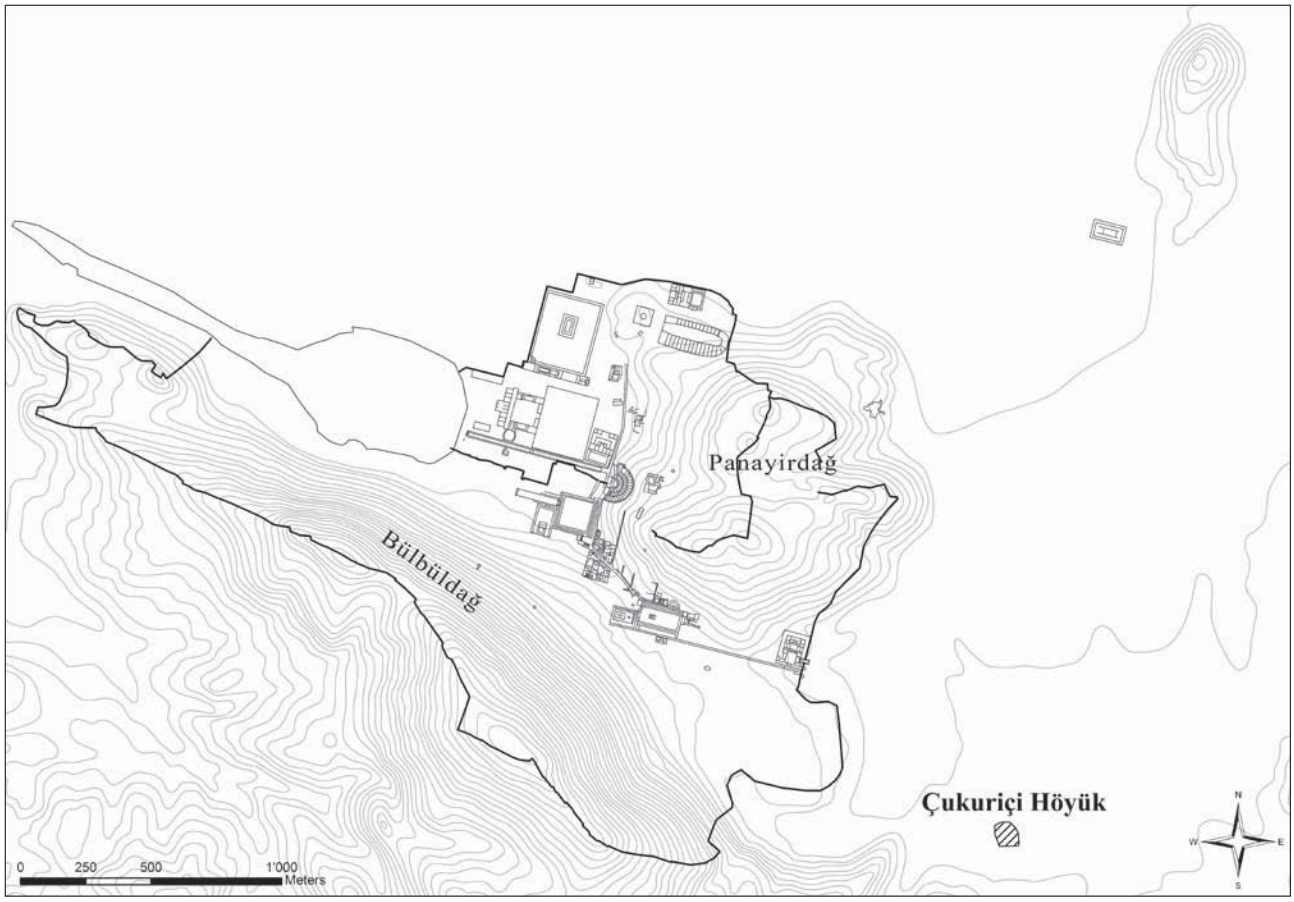

Fig. 2 Topographical map with antique Ephesos and Çukuriçi Höyük. Map by Ch. Kurtze.

1 Cf. Lichter 2005, 59–64.
2 For example, the large-scale project IRERP focused on excavations at Liman Tepe, Panaz Tepe, Baklatepe and Çeşme Bağlararası directed by A. and H. Erkanal (Erkanal 2008a; Erkanal 2008b; Şahoğlu 2007; annual excavation reports KST); Miletus (Parzinger 1989; Voigtländer 1983; Niemeier 2007); Bademgediği Tepe near Metropolis (Meriç – Mountjoy 2002; Meriç 2003; Meriç 2007 and Tavşan Adası near Didyma (Bertemes – Hornung-Bertemes 2009).
3 Horejs forthcoming.
4 Meriç 2009.
5 Late Bronze Age necropolis with currently three investigated graves: Meriç 2009, 70 f.–71 fig. 59–62; pl. 12–13, K115–K117; Horejs 2008c.
6 Excavations in Artemision by A. Bammer, at Ayasoluk by M. Büyükkolancı summarised with literature s. Horejs 2008c, 120 f.
7 Meriç 2009, 31; pl. 10, K99.
8 Mercangöz 2002; I would like to thank the excavation director for her intensive guided tour and useful information. Discussion of further supposed sites of 2nd millennium BC s. Horejs 2008c, 121 f with footnotes 118–124.
9 Meriç 2009, 65; pl. 10, K104–105.
10 Clear differentiation between both periods seems problematical to the author at present due to the lack of closed contexts in the region, especially if the sites are dated by surface finds. The duration of chronologically characteristic pottery types like cheesebowls or Troy A12-bowls is unclear at the central Aegean coast until stratigraphically defined assemblages are excavated, radiocarbon-dated and published.
11 Meriç 2009, 31 f.; pl. 2, K20. K22; pl. 3, K34.
12 Meriç 2009, 64; pl. 1, K10–K11; pl. 3, K36; pl. 4, K48; pl. 5, K53. K54. K61. K65.
13 Herling et al. 2008, esp. 16–26.
14 Only one single pottery fragment with no further description of the site is published (Meriç 2009, pl. 3, K32).

(late 7th/6th millennium BC) settlements are known – Arvalya Höyük and Dedecik-Heybelitepe; the latter has been stratigraphically excavated by Clemens Lichter[15]. Surface finds from Arvalya Höyük have been collected and published by Adil Evren and Çengiz İçten of the museum in Selçuk[16]. This possible tell settlement appears to be covered by meters of alluvium, is intersected by a modern street and furthermore affected by recent pits and its current use as a farm. Although the perennial surveys of Meriç provide a first insight into the prehistory of the region, the lack of systematic excavations in the vicinity of Ephesos has prevented any further basic research so far. For this reason, the former director of Ephesos excavations, Friedrich Krinzinger, initiated a new research program intended to particularly concentrate on prehistoric sites in this micro-region. This interdisciplinary project, funded by the Austrian Science Fund[17], started in 2007 and is focused foremost on a tell site named Çukuriçi Höyük, located around 1 km southeast of ancient Ephesos (Fig. 1–2).

Excavations at Çukuriçi Höyük

Çukuriçi Höyük was first investigated in 1995 in a brief rescue-excavation in the form of two small test trenches conducted by Evren and İçten. According to the excavation report[18], no traces of architecture or stratigraphic layers could be detected; the published material dated it to the Chalcolithic and Early Bronze Age periods but offered no clear context[19]. During the following years a large part of the hill was dug away, leveled, planted with fruit trees and irrigated. These massively destructive measures ultimately had the result, amongst others, that Çukuriçi Höyük became the focus of our perennial project. Furthermore the site is not only located very close to the river and the Aegean[20], but also to Ephesos itself without showing any intensive usage after prehistory until the 20th century AD.

By means of trial excavations in 2006, the hill was preserved to a height of at least 4.5 meters above the ground level of the surrounding cultivated area with an extension of approx. 80 × 100 meters. Two separate areas have been ex-

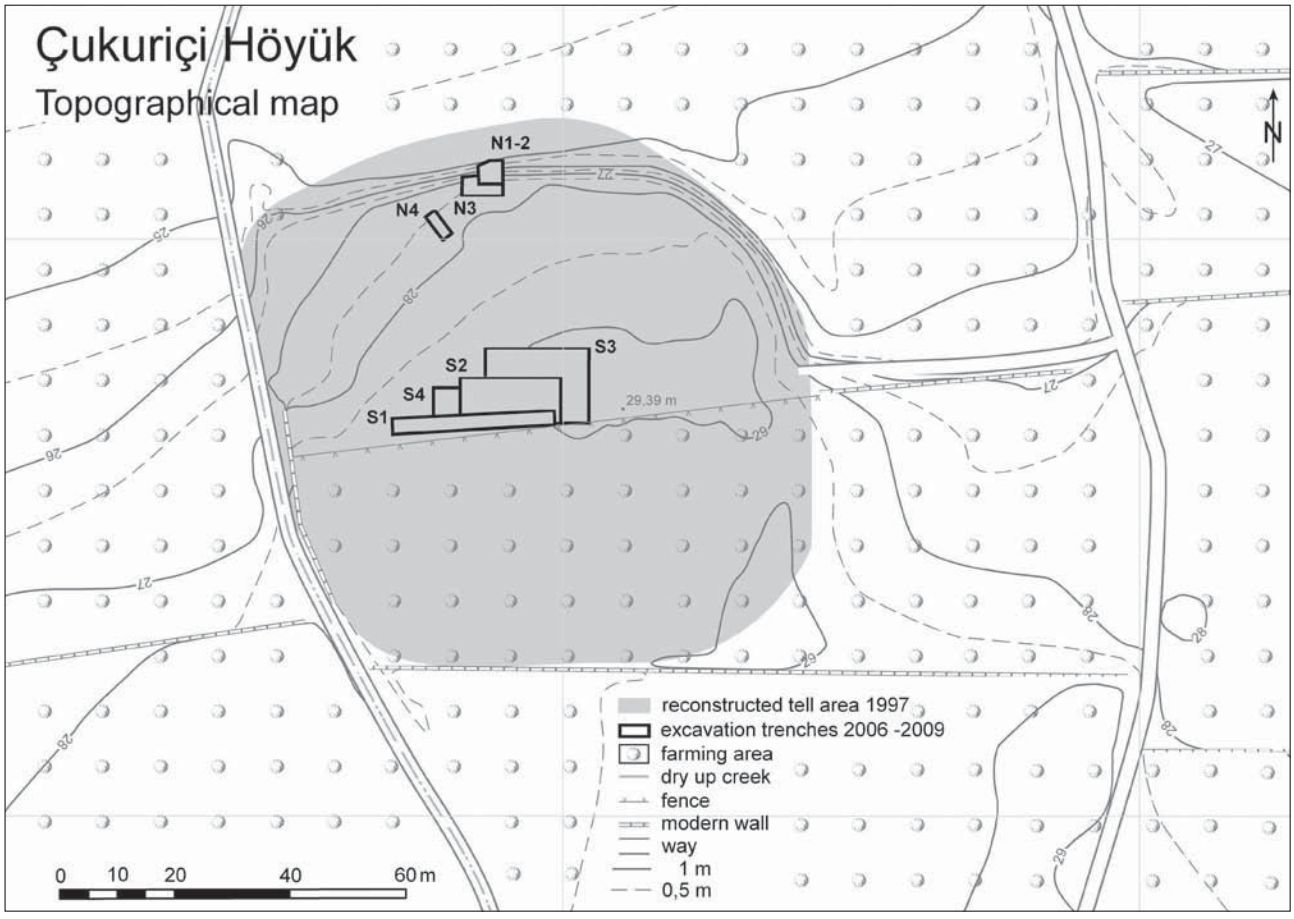

Fig. 3 Topographical map of Çukuriçi Höyük with reconstructed size and excavated trenches. Survey A. Buhlke, Ch. Kurtze, R. Turck. Cartography by A. Buhlke.

15 Herling et al. 2008, esp. 16–22.
16 Evren –İçten 1997, 117 f.
17 FWF-Project no. P 19859-G02.
18 Evren – İçten 1997, 112–116; 128 fig. 8.
19 Evren – İçten 1997, 121–127 fig. 3–7; 129 fig. 9–11; 130–131 fig. 12–15.
20 Although the exact course of the coastline during the past millennia is unclear, we know at least that the area of the antique city was silted up in the 2nd millennium BC at the latest (Kraft et al. 2005). New geological drillings on the plain around Çukuriçi Höyük were conducted by H. Brückner (University of Marburg) and his team in 2008, followed by a broader geographical project in 2009, which should provide further information in the future.

cavated so far, one in the middle of the northern boundary (northern trenches N1–N4) and one at the current southern end of the tell (southern trenches S1–S4); these areas are not yet stratigraphically linked yet (Fig. 3). Çukuriçi Höyük currently reveals at least five settlement phases[21], which can be dated to the Late Neolithic/Early Chalcolithic, to Late Chalcolithic and Early Bronze Age periods[22]. The oldest settlement phase is designated ›ÇuHö VIII‹ and was excavated in the northern trenches (N1–N2) at the level around the present-day foot of the tell in a very limited area of only 4 × 3.5 m[23].

Deposits and Assemblages of Phase ÇuHö VIII

Settlement phase ÇuHö VIII is composed of different deposits, which can be reconstructed as remains of simple house architecture. Coarse raw and local stones were used for two almost parallel stone foundations in an east-west direction (Fig. 4). Mud walls without burnt bricks upon these stone foundations could barely be recognised[24]. The parallel stone foundations are complemented by other settlement elements like posthole, pit and a coeval thick stamped clay floor with more than one level demonstrating two living horizons upon its foundation (Fig. 4). The fragmentary archaeological remains could be reconstructed as part of a piece of architecture, probably a small rectangular room or house, but due to the limited excavated area, its exact shape and size cannot yet be determined. Comparable layers of stone rows covered by mud deposits could be detected along the attached profiles of the northern border of the tell located at the same level with the walls of phase ÇuHö VIII. Therefore, further settlement remains in an eastward and westward direction can

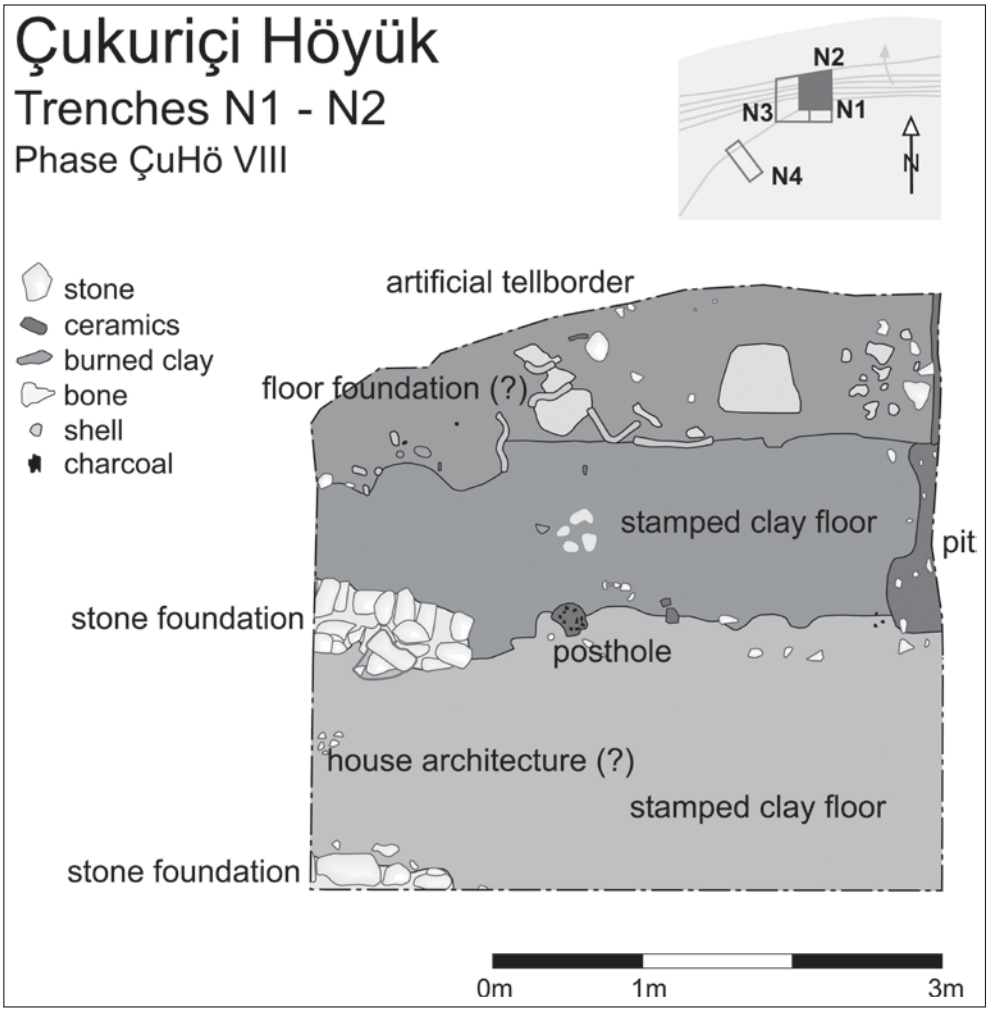

Fig. 4 Deposits of settlement phase ÇuHö VIII: architectural remains and different using horizones. Drawing by A. Buhlke, B. Horejs, A. Nordmeyer.

21 A settlement phase includes all layers and stratigraphical units from its beginning to different using horizons and renovations up to its destruction and abandonment (after Hänsel 1989, 55–57; fig. 8).

22 For further information about methods of excavation and dating with details about the younger phases s. Horejs 2008a; Horejs 2008b; Horejs 2009.

23 The northern trenches were excavated to get an idea of the principle chronological time span of the site, which is why only a small but deeper area was excavated.

24 Compare digital drawing of this distinct mud-level upon the stone foundations in Horejs 2008b, 94 fig. 4.

be assumed. The northern boundary of these remains is artificial and was probably caused by a bulldozer. The area excavated had been covered by a destruction level and a layer of debris sealing the whole phase[25]. The following architectural phase designated as ÇuHö VII can be dated to the Late Chalcolithic period[26]; hence a long hiatus between phases ÇuHö VIII and VII – at least in this distinct area of the settlement – has to be postulated.

Pottery of ÇuHö VIII

Although the excavated area of Phase ÇuHö VIII is very limited, nearly 500 characteristic fragments[27] of around 1,700 pottery sherds have been found. The assemblage contains a homogenous spectrum of very high quality ceramic in comparison to the other periods at Çukuriçi Höyük. It predominantly consists of fine or medium wares; only a small amount can be categorized as coarse ware, based on its porosity and temper[28]. Aside from two singular pieces, the entire pottery ensemble is unpainted and monochrome.

The whole assemblage could be classified in altogether 13 wares based on hardness, porosity, break, color, temper and surface treatment that can be combined in five main groups. The predominant group of wares is finely porous, bright orange, red or reddish-brown slipped with a highly burnished and polished surface and represents more than 40% of the whole assemblage. Second most common with a proportion of around 27% is a group of fine ware with grey to grey-brown color, which is not slipped, but burnished (traces of burnishing are visible). The third group of fine wares is characterized by beige or creamy blunt slip covering red surface with no further treatment in an amount of approx. 7%. Only around 10% can be categorized as coarse wares, of which one-third is impressed decorated and designated as Impresso ware. Its decoration can be coarse with deep impressions or thin and shallow, but always unconnected and covering the whole body. Painted pottery is only represented by a couple of body sherds, red slipped with creamy-white dots on the surface.

As with the makes, the spectrum of shapes contains a clear and homogenous repertoire. Most common are open vessels, mainly deep bowls, with a smooth s-profile or a slightly curved wall and out-curving or rounded rims (Fig. 5a – b). Deep bowls with straight and thin walls do not appear very often (Fig. 5c). The second group of shapes is represented by slightly more hole-mouth jars with a more or less conical neck and a simple rounded or everted rim (Fig. 5d – e). One well-preserved example of hole-mouth jars was deposited directly in the older horizon of the stamped clay floor. This miniature pot was originally provided with four vertical tubular lugs vertically perforated, three of them

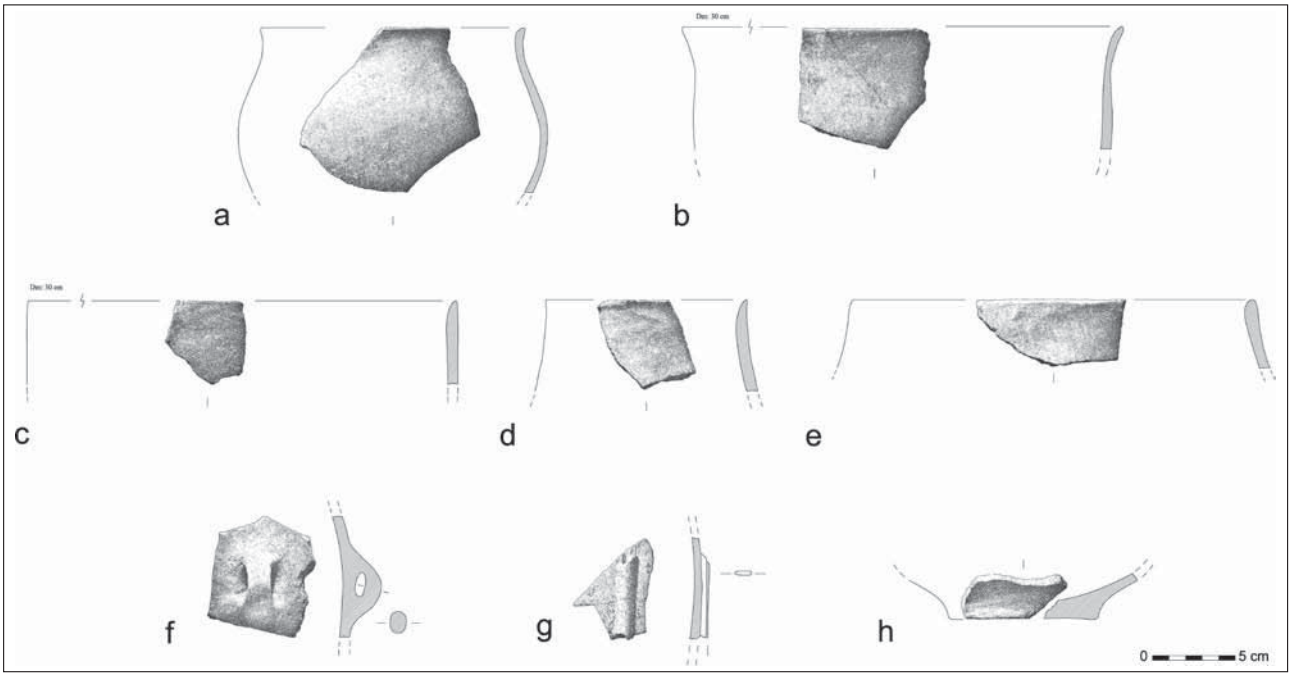

Fig. 5 Spectrum of shapes of phase ÇuHö VIII (a. 06/23/1/1. b. 06/26/1/5 c. 06/26/1/13 d. 06/112/1/5 e. 06/114/1/2 f. 06/11671/30 g. 06/116/1/40 h. 06/26/1/27). Digital drawings by Th. Urban.

25 Cp. Horejs 2008b, 94 fig. 4 with sequence of the layers.

26 Radiocarbon measurements of two short-living samples date to the second half of 4th millennium BC (publication in preparation).

27 Detail publication of all finds of the Chalcolithic periods at Çukuriçi Höyük with all statistics is in preparation at present. Characteristic fragments include rims, bases, handles and decorated bodysherds.

28 Classification based on differentiation of sherd-break as finely porous means no pores or scarcely any pores are visible to the naked eye (0.12–0.25 mm), medium porous that occasional pores are recognisable (0.25–0.5 mm) and coarse porous with pores larger than 0.5 mm.

still preserved (Fig. 6). As far as we can tell from partly very small rim fragments, all the vessel types seem to have a circular mouth. The few handles are simple vertical or formed as plain or vertically perforated lug-handles or knobs. Vertical tubular lugs are mainly short and relatively wide (›Röhrenösen‹), rarely long and narrow (›Schnurösen‹) and finally, the base of all jars is mainly disc-shaped (Fig. 5f – h).

Regarding analogies in shapes and fabrics of the assemblage in phase ÇuHö VIII, two regions are promising, the Lake District in southwestern Anatolia and the vicinity of İzmir as well as the neighboring Aegean islands. For example, the almost completely preserved miniature hole-mouth pot (Fig. 6) can be compared with similar jars in Höyücek TD[29] and Bademağacı EN II[30]. Both examples show comparable semi-globular bodies and four vertical and short tubular lugs at transition to the neck. While the Çukuriçi sample stands on a disc-shaped base, its analogies in the Lake District have rounded or flat bases. Further similarities can be detected with two jars in Ulucak IVb concerning the principle shape, but with differences in the distinct formed neck[31]. Principally similar hole-mouth jars with a globular body and four vertically pierced lugs placed on the shoulder can be found in the Upper Cave of Agio Gala[32] as well as in Ilıpınar X[33], where they are characterized by Laurens Thissen as reliable chronological markers for the oldest pottery on the site and compared with Lake District finds (Hacılar, Höyücek, Bademağacı)[34].

The characteristic elements of the Çukuriçi assemblage of monochrome red-slipped burnished pottery in combination with bowls with smooth s-profile, conical necked pots, disc bases and tubular lugs as at Çukuriçi Höyük can be detected at different sites in the Lake District, as in Bademağacı (EN II)[35], Höyücek (mainly TD?)[36], Kuruçay (mainly 11)[37] and Hacılar I[38]. It should be pointed out that all these settlements are characterized by a versatile spectrum of shapes and decorations,

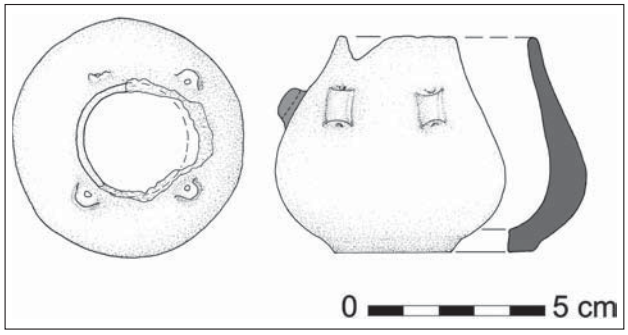

Fig. 6 Narrow-mouth jar with four vertical tubular lugs (06/165/1/102). Drawings by B. Horejs and J. Traumüller.

which does not appear in ÇuHö VIII. Unsurprisingly, the best analogies for our assemblage can be found on the central Aegean coast and its hinterland[39]. The essential material features of ÇuHö VIII are well comparable with the assemblages of Ulucak (V–) IV[40], Yeşilova III[41], Ege Gübre[42] and Dedecik-Heybelitepe A[43]. Further analogies can be found in Agio Gala Lower Cave, unfortunately without a clear stratigraphical context[44].

Aside from the typological analogies, the composition of wares and fabrics seems important in understanding the structures of relations in a chronological and cultural sense. The earliest horizon on the central Aegean coast has been characterized by Ulf Schoop as »Monochromkeramische Agäisgruppe« and by Lichter as »WARP« (»Westanatolisch Rot Polierte Keramik«)[45], which both describe the spectrum of Çukuriçi Höyük quite well. Apart from the dominant red slipped burnished wares it should be stressed that also unslipped grey and grey-brown as well as creamy slipped wares exist in smaller amounts, which show strong connections to e. g. Ulucak V – IV, especially V late and IV early phases[46].

Other Categories of Finds in ÇuHö VIII

The spectrum of small finds is conspicuously limited compared to the amount of pottery. This fact might be best explained by the limited excavated area[47]. Although the ensemble of knapped stone artifacts is rather small with only 26 pieces in total, the lithics offer some information[48]. All artifacts are obsidian[49], except one flint and one chert object. Chemical analyses performed on ten of the obsidians revealed that all of them originated from the Cycladic island of Melos, specifically six from the site of Adamas and four from Demenegaki[50]. Due to the total lack of cores and only rare occurrence of production debris, it can be stated that the knapping site is not located within the excavated area, which is hardly surprising in a living quarter. Nine of the artifacts are medial blades with parallel edges, four of those without further modifications or traces of use. In total 18 modified artifacts were identified. These include two scrapers, the rest

29 Duru – Umurtak 2005, pl. 64, 6 (different mouth).
30 Duru 2008, 61 fig. 117a.
31 Çilingiroğlu et al. 2004, fig. 25. 27–28; Çilingiroğlu – Çilingiroğlu 2007, fig. 6.
32 Hood 1981, fig. 31, 186.
33 Thissen 2001, 15 f.; 90 fig. 4; 95 fig. 9–10. – Instead of tubular lugs these pots are equipped with pierced knob handles.
34 Thissen 2001, 15.
35 Duru 2008, 56 f. fig. 112–113; 61 fig. 117.
36 Duru – Umurtak 2005, pl. 99–100. 102; Duru 2008, 62 fig. 118; 64 fig. 120.
37 Duru 1994, 20 f.: Type no. 8, 9 (level 11), 24 (level 13–9); 24: Type no. 7 (level 11), 10–11 (level 11); 101 f.; pl. 34–57. 97; Duru 2008, 55 fig. 111; 68 fig. 124.
38 Mellaart 1970.
39 My sincere thanks to A. and Ç. Çilingiroğlu, Z. Derin and H. Sağlamtimur for intensive discussions and important advice at a workshop in Istanbul University in March 2009.
40 Çilingiroğlu et al. 2004, 38–41; fig. 21–25 (Ulucak IVa – b); Çilingiroğlu – Çilingiroğlu 2007, fig. 6 (Ulucak IV); 24–25 (Ulucak V).
41 Derin 2007, fig. 8–10 (Yeşilova III. 1–8).
42 Sağlamtimur 2007, fig. 6a. 7–9.
43 Herling et al. 2008, 21 f. fig. 4.
44 Hood 1981.
45 Schoop 2005; Lichter 2005; Lichter 2006.
46 My sincere thanks to Ç. Çilingiroğlu for showing me the material.
47 The ensemble contains a few ceramic discs, simple bone artefacts and a clay stamp (publication in preparation).
48 Lithics of all phases are under study by M. Bergner.
49 Horejs 2008a, fig. 17.
50 Bergner et al. 2008.

shows mostly unilateral retouched edges which are interpreted as sickle blades. According to Max Bergner it can be concluded that the majority of the knapped stone artifacts are obsidian sickle blades with relatively little production waste. The obsidian is of Melian origin and the knapping site appears to be outside of the excavated area.

Dating and Chronology

The ceramic features considering fabric and shape and their analogies indicate a dating of Çukuriçi Höyük VIII in the horizon of Ulucak IV (IV early/V late?), Yesilova III, Ege Gübre and Dedecik-Heybelitepe A. Although these sites represent a multiplicity of different phases in this period, the limited excavated area of Çukuriçi VIII avoids a distinct synchronisation for now. To date it seems that ÇuHö VIII can be synchronized with features of both Ulucak V and IV and EN II in the Lake District. But due to the lack of some characteristic elements (anthropomorphic vessels, storage jars, and particularly, small finds) and regarding the small amount of pottery, statistical analysis of relations of particular fabrics in the assemblage could lead to a possibly distorted image. Therefore Çukuriçi VIII should be dated to the early Chalcolithic period with possible late Neolithic features in the assemblage until further areas are excavated in the future.

This relative chronological position of ÇuHö VIII is confirmed by a set of radiocarbon dates of different kinds of material. The final analysis by Bernhard Weninger is still being evaluated, but a preliminary dating around 6000 BC and possibly up to 6200 BC seems acceptable. These dates fit rather well in the chronology of the Lake District and the central Aegean coast. While only some years ago a lack of high quality radiocarbon dates in western Anatolia compared to other regions avoided a clear dating of the region, which was pointed out by Thissen[51], this gap is about to be slowly filled[52]. Following recent publications and discussions[53], the dating of Pottery Neolithic permanent settlements in western Anatolia seems to differ between the Marmara-Black Sea region, the central Aegean coast and the Lake District, of which the latter one seems to be oldest, whereas the dating is shifting backwards with each new or further excavated site (e.g. Bademağacı and Ulucak). Only a few settlements in western Anatolia date as early as the first half of the 7th millennium BC or even older[54], but most have to be dated to the second half of 7th millennium BC[55]. The four sites of Ulucak, Ege Gübre, Yeşilova and Dedecik-Heybelitepe represent the oldest Neolithic/Early Chalcolithic horizon presently known on the central Aegean coast, dating back to the mid (Ulucak) and late 7th millennium BC[56]. Even though there are no updated ^{14}C-dates for Agio Gala on Chios[57], it is clear regarding relative chronological terms based upon pottery analogies that this site is part of the same cultural horizon, in which Çukuriçi Höyük VIII should also be placed.

Preliminary Results from Zoological Studies (by Alfred Galik)

The geographical and the chronological position of Çukuriçi Höyük contributes new insights and additional information to the checkered pattern of Neolithic and Chalcolithic husbandry derived from other sites situated in the Sea of Marmara area and southeastern Europe. However, the Neolithic achievements shifted some way from southeastern Anatolia westwards, and further investigations at Çukuriçi Höyük can bring some new results as a possible base for a transition along the Aegean coast line.

As the investigations are still ongoing at Çukuriçi Höyük, the results presented here must be considered as preliminary. However, the archaeozoological material is summarized according to the main chronological units, although the excavations revealed alternating structures of settling and abandonment of the architectural structures. The chronological sequences start at Late Neolithic/Early Chalcolithic and go up to the Early Bronze Age. The major part of the material comes from Early Bronze Age Phases ÇuHö IV and III. In order to compare the remains from Early Bronze Age with Late Neolithic/Early Chalcolithic finds, both phases will be summarized.

At the base of Çukuriçi Höyük the earliest layers were discovered at the beginning of the excavation activities, but then the emphasis was placed on the Early Bronze Age levels at the top of the Höyük. Nevertheless, the findings of the first excavation season accumulated in a frequency which allows for developing some considerations on the Late Neolithic/Early Chalcolithic subsistence in comparison to the better represented Early Bronze Age remains. As the excavations were carried out in the Early Bronze Age part of Çukuriçi Höyük intense flotation of sediment samples was carried out. The remains obtained from the sieve residues are excluded from this discussion to achieve a better comparability with the Late Neolithic/Early Chalcolithic and Early Bronze Age remains. The results will be placed in another publication.

The Late Neolithic/Early Chalcolithic remains of domesticates dominate the sample (Fig. 7–8), but mollusks and game appear in a noticeable representation. The Early Bronze Age sample reveals a completely different pattern. Mollusks outweigh the animal distribution in NISP as well as weight (Fig. 7–8). The representation of domestic animal remains probably mirrors a minor importance in exploitation in the Early Bronze Age.

The quantification of game seems to be similar in both chronological units and reflects an analogous exploitation of wild animals. Birds, fishes and crustaceans reveal the ex-

51 Thissen 2005, esp. fig. 1.
52 Data recently collected by Clare et al. 2008, 14 fig. 4; 24 fig. 9; 31–34.
53 e.g. Lichter 2005; Schoop 2005; Özdoğan 2006; Özdoğan 2007a.
54 Radiocarbon dates for all sites in the Lake District summarized by Duru 2008, 11–19.
55 Summarized graphically by Özdoğan 2007b.
56 Çilingiroğlu – Çilingiroğlu 2007, 363 f.
57 Hood 1981. Besides missing radiocarbon dates, the stratigraphy and an evaluation of assemblages in the Upper and Lower cave are also still under discussion (cp. Schoop 2005, 248–252).

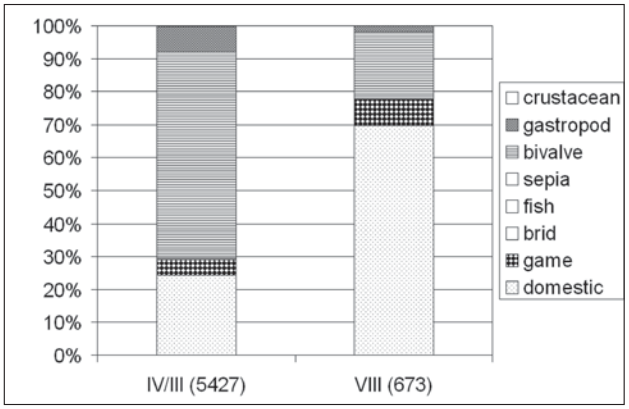

Fig. 7 Quantification of animal remains from Çukuriçi Höyük based on NISP.

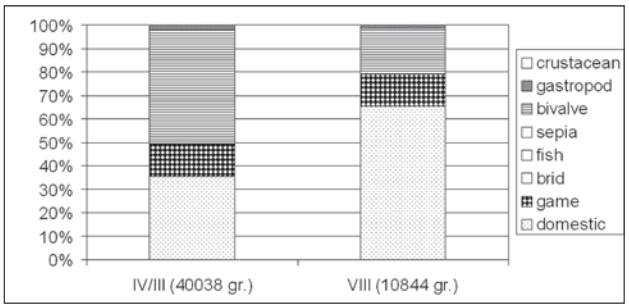

Fig. 8 Quantification of animal remains from Çukuriçi Höyük based on weight in gram.

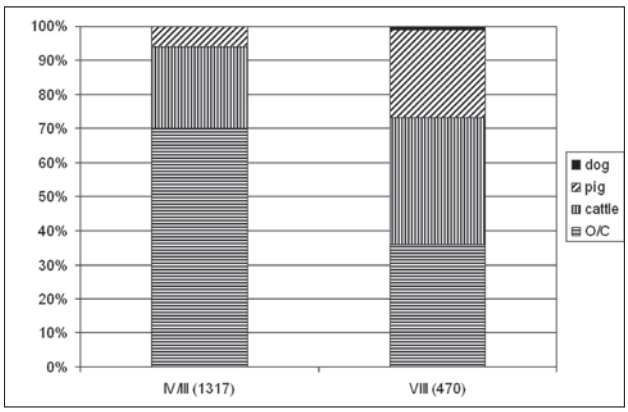

Fig. 9 Quantification of the major domesticates including dog from Çukuriçi Höyük based on NISP.

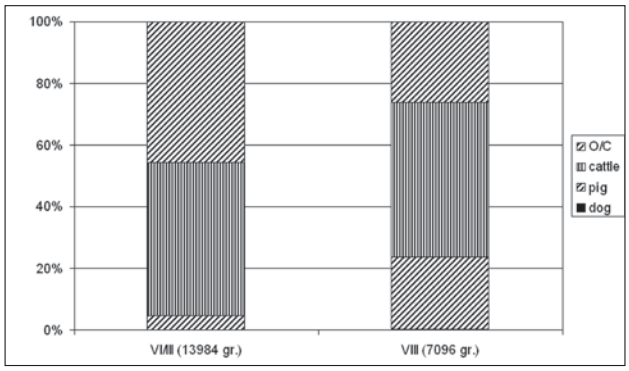

Fig. 10 Quantification of the major domesticates including dog from Çukuriçi Höyük based on weight in gram.

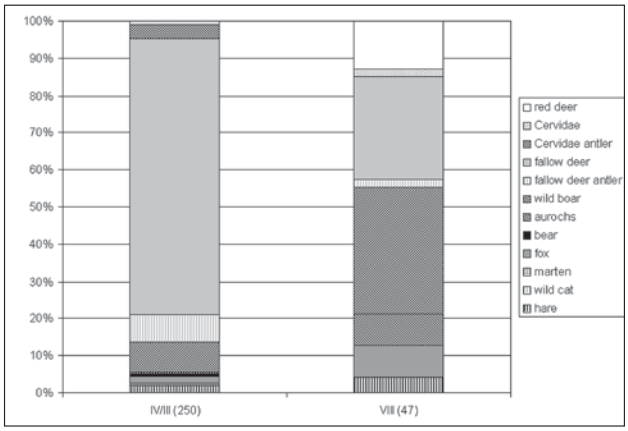

Fig. 11 Quantification of small and large game from Çukuriçi Höyük based on NISP.

ploitation of natural resources for the nutrition of the Early Bronze Age inhabitants. The wild birds represent two areas of hunting. On the one hand water birds like ducks, geese and pelican were caught and on the other hand quail (*Coturnix coturnix*) indicating hunting of small birds in an open countryside. The Early Bronze Age fish remains indicate inshore fishing activities for fishes like gilthead bream (*Sparus aurata*) and parrotfish (*Sparisoma cretense*). Finds of sometimes rather large shark and ray remains may indicate fishing in open waters and an outstanding find is the sting of a large stingray (Dasyatis sp.).

Among the major domesticates a few dog remains are present in Phase VIII as well as in the Early Bronze Age assemblage. Although butchering marks are absent, a tibia shows traces of burning at its fractured shaft. Therefore, it could be considered that people sometimes consumed dog meat. The quantification of the three major domesticates in Phase VIII of Çukuriçi Höyük reveals a rather balanced exploitation pattern even considering bone weight (Fig. 9–10). The Early Bronze Age sample reflects a change in use of domesticates. Pigs decrease drastically and ovicaprines became more important, indicated by a more or less equal bone weight with cattle remains (Fig. 9–10).

The Late Neolithic/Early Chalcolithic game remains are represented in lower amounts, but red deer, fallow deer and a higher quantity of wild boar and some specimens of aurochs appear in the sample (Fig. 11). The ›possible‹ aurochs remains are generally proven only by a few and rather small fragments. The observed Late Neolithic/Early Chalcolithic pattern changes completely in the Early Bronze Age, as fallow deer becomes the dominant taxon of the game fauna (Fig. 11). Up to now remains of brown bear occurred only in the Early Bronze Age assemblage. Hunting of small game can also be reflected by few percentages in both assemblages. Most important were probably hare and fox. Marten and wild cat can be proven only by a few specimens in the Early Bronze Age assemblage.

Late Neolithic/Early Chalcolithic and Early Bronze Age bivalve fauna obviously indicate completely different exploitation behavior, not only in the massive increase of shells in the Early Bronze Age assemblage but also in the frequencies of exploited species. In the Late Neolithic/Early Chalcolithic as-

semblage (NISP 138) Noah's ark shell represents 58%, spondylus 18%, oysters and a few examples of blue mussel 2.9% and 16% indicate exploitation of edible cockles. In the Early Bronze Age (NISP 3387) edible cockle (*Cerastoderma glaucum*) outweigh the assemblage with more than 90%, besides a large variety of species like Noah's ark shell (*arca noae*), corneous wedge clam (*Donacilla cornea*), bearded arch shell (*Barbatia barbata*), blue mussel (*Mytilus galloprovincialis*), oyster (*Ostrea edulis*), pen shell (*Pinna nobilis*), spiny cockle (*Acanthocardia tuberculuata*), razor shell (Solen sp.), spondylus (*Spondylus gaederopus*), carpet shell (*Tapes decussatus*) and venus shell (*Venus verrucosa*). Investigations on the mollusk fauna of Troy revealed similar pattern for Early Bronze Age Troy[58].

In Phase VIII of Çukuriçi Höyük only 10 purple snail shells and two limpets can be counted, whereas the Early Bronze Age assemblage (NISP 423) indicates a more intense exploitation of marine gastropods not only for nutritive reasons but probably also the collection of small shells as raw material for ornaments. However, the main part is represented by limpets (patella sp.), followed by ceriths (*Gourmya vulgata*) and purple snail (*Hexaplex trunculus*) and other species like dove shell (*Columbella rustica*), top shells (Gibbula sp., monodonta sp.), barley snail (*Barleeia rubra*), whelk (*Buccinulum corneum*), dog whelk shell (*Hinia reticulata*), conus (*Conus mediterraneus*), purple dye murex (*Bolinus brandaris*) and a few edible garden snails (Helix sp.). So far, Çukuriçi Höyük has revealed no evidence of purple dye production like that in Troy[59].

The shift in faunal composition from arboreus taxa like pigs, red deer and wild boar to taxa preferring more open land habitats like ovicaprines or fallow deer may give a hint of a change of vegetation. Similar results are described from Ilıpınar[60], where deforestation took place from Neolithic to Chalcolithic. According to the faunal exploitation pattern it seems plausible that Late Neolithic/Early Chalcolithic as well as Early Bronze Age inhabitants had access to the sea. However, in ancient times and still today a gradual silting-up of the Küçük Menders Bay can be assumed and observed. Thousands of years ago the shore line was a completely different shape[61]. In Late Neolithic/Early Chalcolithic times people collected mainly bivalves living in rocky habitats. The high abundance of fossorial bivalves in the Early Bronze Age might also be a clue for the deforestation of this region, which probably induced a high input of sediment and created new sandy biotopes on the shoreline adjacent to Çukuriçi Höyük.

In case of husbandry Çukuriçi Höyük may reveal an intermediate position in comparison to northern and southern sites. The focus in late Chalcolithic Pekmez[62] near Aphrodisias was probably more on ovicaprines and pigs, while the amount of pig decreases in the Early Bronze Age sample. Other Neolithic and Chalcolithic sites like Fikirtepe[63], Ilıpınar[64] and Menteşe[65] reveal that cattle and ovicaprines were the most exploited species, whereas in the late Chalcolithic of Top Tepe[66] ovicaprines dominate the assemblage. In Chalcolithic Arslantepe[67] ovicaprines and cattle were important and in the Early Bronze Age an increase of ovicaprines is observable. The Chalcolithic remains of Hassek Höyük[68] illustrate another pattern; ovicaprines were most abundant followed by pigs, and in the Early Bronze Age assemblage pigs appear to be of more importance than ovicaprines. However, it seems that from Early Bronze Age onwards the preference of breeding ovicaprines starts to spread from the southeastern Anatolian sites[69], in Demircihüyük[70] via Turkish Thrace[71] up to sites on the Greek mainland like Agios Mamas[72] and Kastanas[73]. As Buitenhuis[74] stated in 1994, there is a rather high diversity in animal husbandry between Neolithic and Chalcolithic sites and phases, and it is hard to argue on the basis of faunal remains that there is a common cultural background of the societies. This may depend on geographical and climate reasons or on the preference of certain species in societies. However, future investigations on material obtained from modern excavations will have the potential to shed some more light on these crucial questions.

Conclusion and Perspectives

Excavations in a small and deep trial trench on the northern boundary of Çukuriçi Höyük revealed a settlement phase (ÇuHö VIII) with few remains of stone and mud-architecture dating to the Early Chalcolithic period. The assemblage of around 1700 pottery fragments shows distinct parallel features with sites in the Lake District as well as the neighboring İzmir region, where the excavated settlements of Ulucak, Ege Gübre, Yeşilova and Dedecik-Heybelitepe as well as Agio Gala at Chios represent the Late Neolithic/Early Chalcolithic horizon. In addition to distinct analogies of the Çukuriçi assemblage to these sites, radiocarbon dates indicate a dating around 6000 BC. However, in order to gain a deeper understanding of early Çukuriçi Höyük concerning questions of architectural systems and settlement structures, handling of different resources and raw materials and stages of development, further excavations in the future are indispensable. Geological drillings that have been conducted by Helmut Brückner and his team since 2008 demonstrate the high potential of the tell for further research. Considering the promising appearance of a few meters of deposition underneath phase ÇuHö VIII we anticipate cultural layers of this settlement of earlier stages than suggested by the current ^{14}C-dates[75].

58 Çakırlar 2008, 97.
59 Çakırlar 2008, 97; Çakırlar 2007, 173.
60 Buitenhuis 2008, 206.
61 Kraft et al. 2005, 127; Kraft et al. 2007; Brückner et al. 2005, 98.
62 Crabtree – Monge 1986, 184.
63 Boessneck – von den Driesch 1979, 69.
64 Buitenhuis 2008, 208.
65 Gourichon – Helmer 2008, 437.
66 Buitenhuis 1994, 143.
67 Bökönyi 1983, 582.
68 Stahl 1989, 164.
69 Yakar 2001, 434.
70 Rauh 1981,15; Boessneck – von den Driesch 1987, 55.
71 Benecke 1998, 176.
72 Becker – Kroll 2008, 115.
73 Becker 1986, 248.
74 Buitenhuis 1994, 143.
75 Publication in preparation.

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Yeşilova Höyük

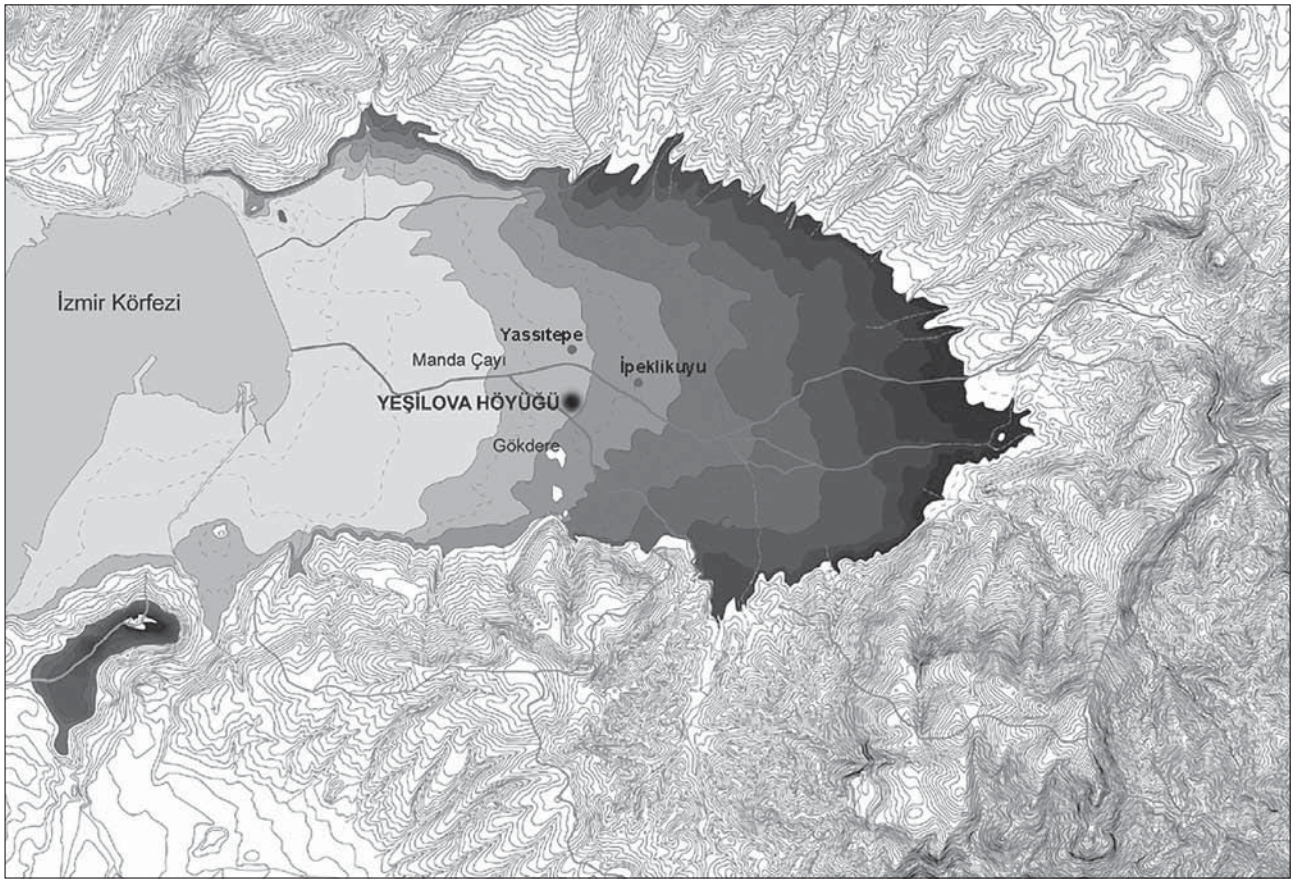
by Zafer Derin

Yeşilova Höyük is situated in the middle of the Bornova Plain, at the meeting point of the Gökdere and Manda rivers. The settlement area is located 80 cm below the plain surface, 4 km from the present-day coastline.

Bornova Plain, which had similar geographical boundaries in prehistory, became home to the first settlers of the İzmir region. There are five prehistoric mounds on the plain[1], including Yeşilova Höyük (Map).

Yeşilova Höyük is the oldest settlement centre within the city of İzmir. This centre, together with Yassıtepe and İpeklikuyu Höyük makes up ›İzmir's Prehistoric Settlement Area‹ (Fig. 1).

Fig. 1 Prehistoric area of İzmir.



Map of the Bornova plain.

1 During the excavations carried out in the years 1948–1949 at Bayraklı Höyük, located north of the coastal strip, cultural levels belonging to the Early and Middle Bronze Ages were uncovered (Akurgal 1950). Recent surveys (Derin – Batmaz 2004, 79; Derin 2006, 1–4) have shown that there are other settlement areas dating to the Bronze Age on the Bornova Plain (İpeklikuyu Höyük, Pınarbaşı-Tepebağ and Yassıtepe Höyük).

The Excavations

Excavations began in 2005 but were followed by a break. Work resumed in 2008 under the auspices of the Culture and Tourism Ministry and the Ege University[2].

The settlement area is thought to be some 70,000 m² in size. In prehistoric times, the Bornova plain, with its easy topography, rich flora and animal resources, was the perfect place to settle for its first inhabitants (Fig. 2).

Yeşilova is a höyük, or mound, type settlement that is now lower than the present day level of the plain. Apart from a very small amount of Late Roman pottery on the surface, no other settlement evidence was visible.

Yeşilova Höyük consisted of three cultural levels. These levels can be listed as follows:
- Level III: Neolithic Period
- Level II: Chalcolithic Period
- Level I: Early Bronze Age – Roman Period

Level III (Neolithic Period)

The Neolithic settlement takes the form of eight cultural layers on top of the virgin soil. Here it is possible to follow the whole Neolithic development in the Aegean Region. Almost every layer contains a deposit of mud-clay, evidence there had been a flood.

Due to the high clay content of the soil, some of the layers that were established immediately after a flood had dried up were almost as hard as concrete.

The Neolithic layers were only researched in a restricted area, where the remains of stone foundations were found (Fig. 3). However, mud floors covered with ashes and with pottery pieces on them were uncovered on every layer.

The most important elements that characterise the Neolithic settlement levels are the pottery and the small finds. These finds show that the Neolithic at Yeşilova Höyük developed in three phases; levels III 8–6, 5–3 and 2–1.

Levels III 8–6

The finds from the first settlement of the höyük were uncovered on virgin soil approximately 4 m below the present day level of the plain. This level's pottery group is handmade and monochrome (Fig. 6).

The pots are well fired. Greyish, light/very light yellowish and reddish brown tones are the dominant paste and surface colours. However, one pottery group is cream in colour.

The following forms have been identified: some of them are spherical in shape and neckless, narrowing at the mouth; bowls with everted rims and flaring shallow bowls are seen for the first time in this phase.

Among the other forms there are necked jars with everted mouth rims, bowls with straight sides, semi-spherical bowls and ›S‹ profile bowls.

Tube handles are frequently seen on the jars. These are usually on the tall jars; there are also a small number of broad jars with this handle type.

Vertically attached round handles are seen on the large jars and short broad ones. The bases of the pots are flat or slightly raised.

The finds show that the industry of stone tools, implements and other items was well developed. Stone vessels make up a significant find group in levels III 6–8.

The finds from Yeşilova Höyük level III 6–8 show close parallels with those of the Early Neolithic levels of the Lakes District settlements, Höyücek (ESP), Bademağacı (EN), Ulucak (Vd – f) and Kuruçay (13)[3]. On this basis, these levels can be dated to around 6,500 BC[4].

Levels III 5–3

Along with the red tones, brown shades are also apparent in the paste and surface colours of the pottery from this period. Most of the pots are reddish-brown in colour, while some of them are covered with a layer of fine reddish-yellow slip.

The most common forms are jars that narrow at the mouth. Some of these are spherical in shape and have no neck. ›S‹ profile bowls also increase in number. The other forms include bowls with straight sides and flaring shallow bowls, necked jars with everted and flattened rims, conical necked jars and jars that narrow at the mouth, ›S‹ profile, semi-spherical bowls and very shallow bowls with everted rims.

In these levels, some decoration is seen on some of the pottery pieces. Examples of pieces with reddish-brown paint on a reddish yellow slip were found. These levels can be dated to around 6,250 BC.

Although the Neolithic people raised some large and small animals for food, they also hunted and ate animals such as wild pigs and deer that lived in the surrounding area. In levels III 4 and 3, cattle make up the largest number of animals.

Levels III 2–1

This level is the richest of the Neolithic levels. It must have begun around 6,000 BC; the same cultural development continued without interruption until 5,700 BC.

New technology and innovations came to the area around this time. The traditional round houses, made of

2 Derin – Batmaz 2004, 75–100; Derin 2007a, 125–127; Derin 2007b, 377–384; Derin 2008a, 217–230; Derin forthcoming; Derin et al. 2010, 7–58.

3 For comparison see Duru 2002, 403 f.

4 The C-14 and thermoluminescence dating of Yeşilova Höyük, carried out in laboratories in Turkey, America and Germany, show that the Yeşilova levels could date to earlier than 6,500 BC.

Fig. 2 Sketch of the neolithic settlement.

Fig. 3 The Neolithic settlement of Yeşilova.

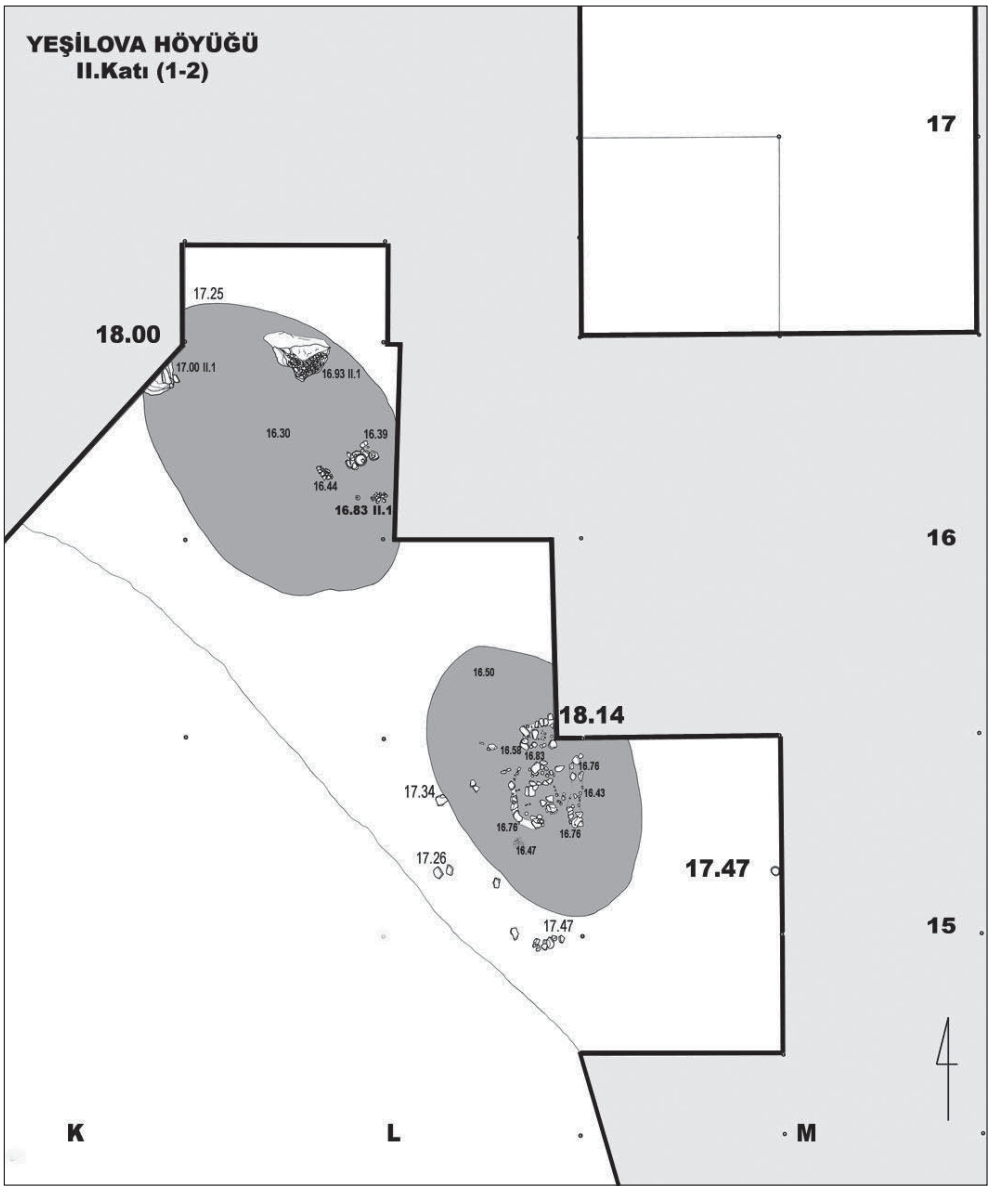


Fig. 4 The Chalcolithic settlement of Yeşilova.

mud bricks, wattle and daub and rushes, were exchanged for rectangular houses with stone foundations (Fig. 3), indicating social change, as well as alterations in building techniques and spatial organisation. Other innovations were red-polished pottery, painted pottery, stamp seals and improvements in agriculture.

The colours of the paste of the pottery from this period are light brown and red. The colour of the slip is reddish-brown and becomes redder towards the surface.

The shape repertoire of the pots includes jars with long necks and everted rims, which are the most common form. Among the bowl shapes are shallow flaring bowls, bowls plain in shape with straight sides and ›S‹ profile bowls (Fig. 5–6). This phase can be seen as the Neolithic renaissance period. The finds are very rich and greater in number. The number of settlements in the İzmir region also increased during this period.

Around 6,000 BC there was a dramatic shift in the climate that brought drought to Anatolia. Many farmers were forced to move to find better-suited areas to live in. People coming from eastern Anatolia started to settle down in the more rainy and fruitful areas of the west. Villages in the coastal region, such as Barbaros, Küçük Yamanlar, Çukuriçi, Yassıtepe, Araptepe, and Ege Gübre had populations swollen by new arrivals and became more crowded[5].

At the same time there were changes in society, social and economic transformations towards a more structured society with social differences.

The sea level was much lower than today and the little mound of Yeşilova was situated on a green plain between two rivers. The people of Yeşilova were farmers and grew wheat, barley and lentils. They had large herds of sheep, goats and cattle in the green fields surrounding the settlement. The economy was diverse as they also fished in the rivers, collected seashells, hunted game and gathered wild herbs.

The consumption of seafood increased especially towards the end of the Neolithic Period. (III 1–3). Almost all of the seafood remains consist of univalves (e.g. screw shells) and bivalves (e.g. mussels) that live in sandy environments in the bays and shallow waters near the shore.[6]

The next-biggest group is the smaller animals such as sheep and goats, and then pigs. It appears that in levels III 2 and I the smaller pastoral animals, sheep and goats, increased in importance; remains of cattle and pigs show a distinct decrease.

Most of the stone tools and weapons are made of flint and consist of different types including arrowheads, blades, cutters, scrapers, piercers and borers (Fig. 9–10). The cores and chips show that the production of flint tools was carried out at Yeşilova. Some stones had been cut to make them square so they could be used to make necklaces. Among the clay items there is a miniature table (Fig. 11) that had been shaped in a similar way to those found in Ulucak IV. It is understood from the pintadera seals with labyrinth and spiral motifs (Fig. 8), similar to those found in level Vb at Ulucak and Bademağacı EN II[7], that the Yeşilova Neolithic community had an organised social structure.

5 Derin 2006, 5 f.–6.
6 Derin 2008, 45 – 57.
7 Çilingiroğlu – Çilingiroğlu 2007, 367, fig. 27; Duru 2008, fig. 76.

Fig. 5 Neolithic pot from Yeşilova.

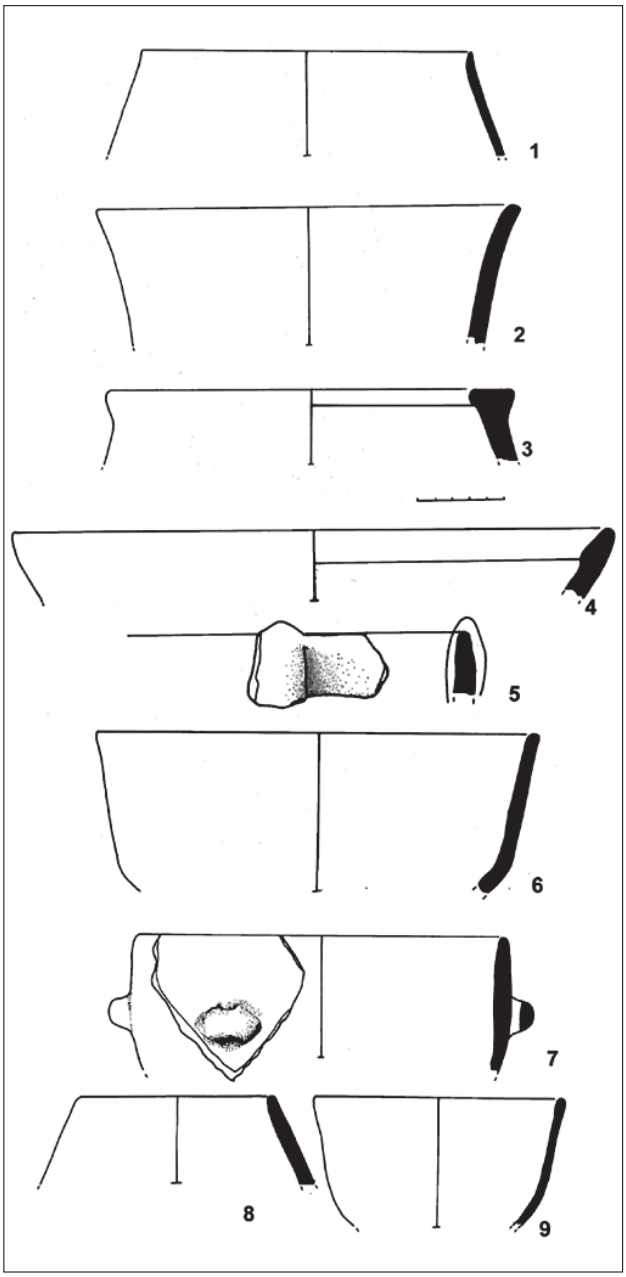


Fig. 6 Neolithic pottery from Yeşilova.

Fig. 7 Fragments of Neolithic pottery from Yeşilova.

It is possible to compare the Yeşilova finds with finds from other excavations around the city of İzmir, primarily Ulucak Höyük followed by Aegean settlements such as Ege Gübre, Çukuriçi and Dedecik-Heybelitepe. The finds parallel those of the nearest settlement to Yeşilova Höyük, Ulucak Höyük level IV, and the pottery from Çukuriçi, Dedecik-Heybelitepe[8]. In addition, the pottery from the level that had architecture with stone foundations at the Aegean Gübre settlement, which had at least a three-phase settlement in the Neolithic Period, red-slipped pottery roughened on the outside and decorated with fingernail impression designs was found in levels III 1–2 of Yeşilova Höyük (Fig. 7). While fingernail impression decorated pieces completely vanish in the lower levels, red slipped pieces decrease towards the lower levels and their surfaces become matte in appearance.

The Yeşilova finds show that the orgins of İzmir go back as far as an Early Neolithic community. The Yeşilova Neolithic community in the central-western Anatolia region underwent their own cultural development and must have had links with both the Lakes Region and with the islands and the Marmara region. These people, who probably came to İzmir from a region further east, were the first here to combine hunter-gathering with stockbreeding and farming, and when they settled in the vicinity of İzmir, the community established its own culture and society; this was not merely a transitional region.

This development process, that includes the end of the level III 1 Neolithic, shows that the Neolithic settlement was abandoned, like Ulucak IV and Ege Gübre III, around 5,800–5,700 BC[9]. There may have been a new, dramatic shift in the climate, which brought drought to West Anatolia.

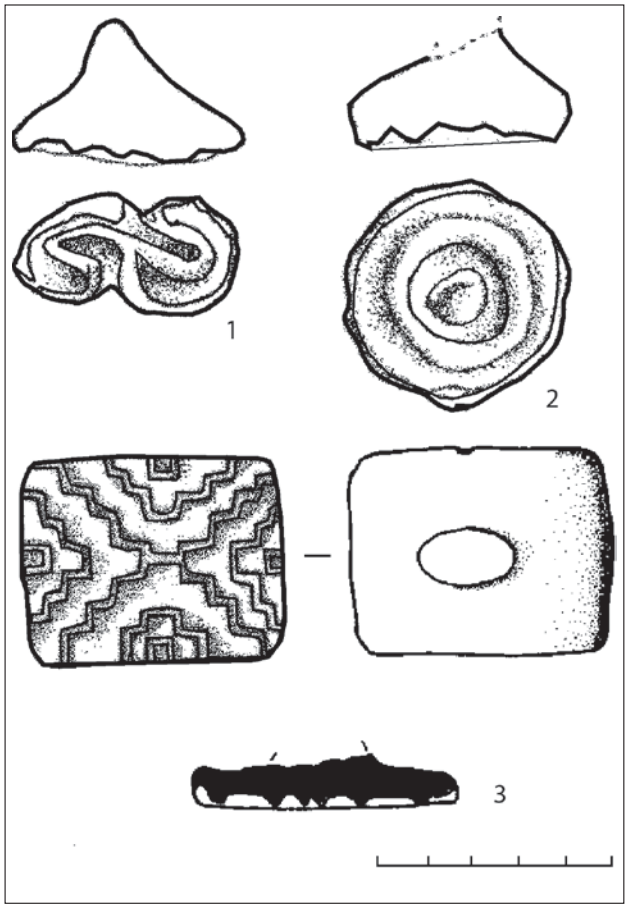


Fig. 8 Neolithic pintadera seals.

8 Horejs 2008; Herling et al. 2008, 20–26.

9 Derin 2005, 87; Sağlamtimur 2007, 376.

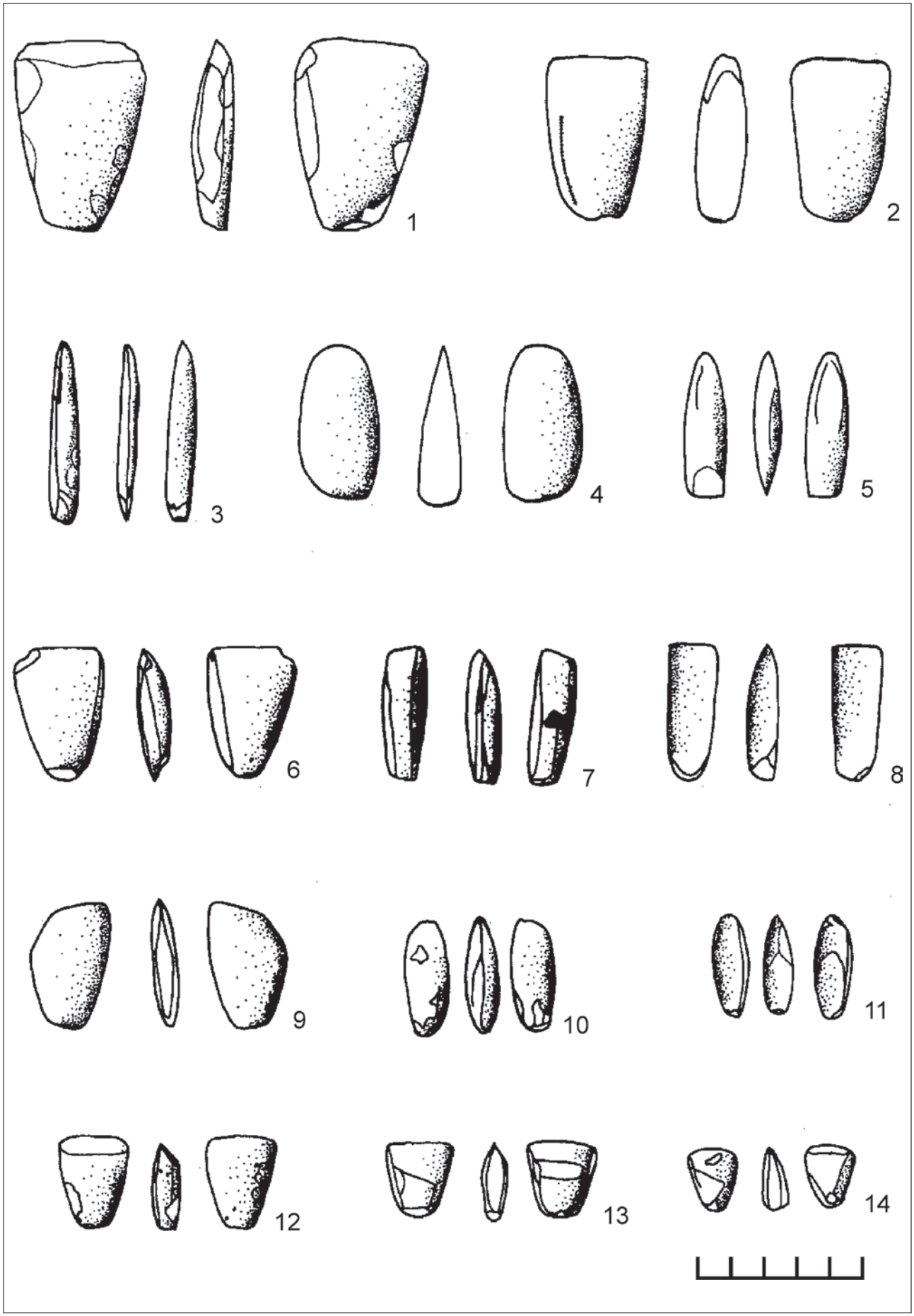


Fig. 9 Neolithic stone axes.

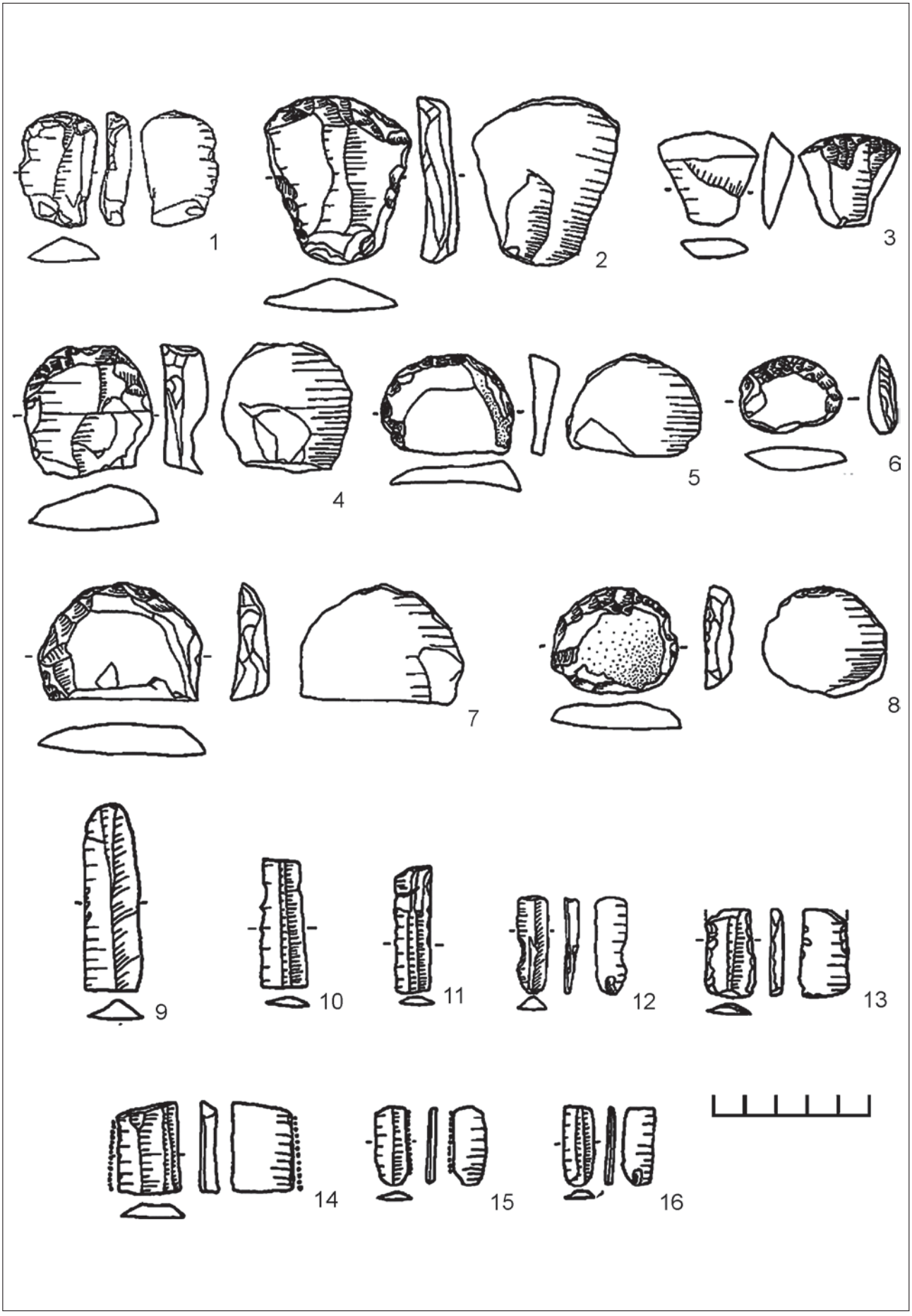


Fig. 10 Neolithic stone tools.

Fig. 11 Small tablet.

There was a thick pebble layer on the level III 1 at Yeşilova (Fig. 14).

Neolithic settlements around İzmir were entirely abandoned, leaving behind ashes and ruins (Fig. 15). The settlements remained deserted until the arrival of new and different communities of the Chalcolithic culture at least 500 years later.

Yeşilova Level II (Chalcolithic Period) – a New Settlement and New Community

A two-phase settlement extending across the whole mound was identified at this level. A hole, or hollow, 1 m in depth and at least 6–8 m in diameter had been opened up in the Neolithic levels, and appears to have been lived in as a hut-type dwelling in two separate periods (Fig. 4). Apart from this hole, the Chalcolithic settlement seems to have continued with other such hollowed out dwellings[10].

Although no architecturally rich finds were found, there was a piece of floor belonging to the last phase of the Chalcolithic settlement at the mound (II 1). In the lower levels of this hollowed-out section there were heaps of debris approximately 16–10 cm in thickness consisting of stones of various sizes, pieces of burnt kerpiç (mud brick) and pots belonged to the second level of the Chalcolithic Period (II 2). Some whole pots and other finds were found in situ on the top of this floor.

The Chalcolithic pottery was generally roughly made. The paste was tempered with small stones and mica, varying in size according to the size of the pots. Some of the pieces of larger vessels were plant-tempered (Fig. 12–13).

Most of the pots were grey and blackish grey in colour, sometimes in shades of brown and brownish-red and burnishing marks are seen are some of them.

There are a variety of vessel types; bowls with rims inverted at the mouth, sharply carinated bowls with inverted rims, bowls with sharp profiles; semi-spherical bowls of which some have vertical handles rounded or oval in shape with spur type protrusions on them and flat lugs; flaring bowls with rims thickened on the inside at the mouth; thick-rimmed, roughly-made, poorly-fired pots with flat bases and straight sides or slightly everted simple mouth rims, with

Fig. 12 Chalcolithic bowl.

irregular, roughly-pierced steam holes arranged in a single row under the rim; one-handled jars with long necks narrowing at the mouth, some with spurs. Basket handles are very common, and mushroom-shaped handles are seen on some of them (Fig. 13).

Most of the pots have hollow bases, while a smaller number have flat bases. Decorated pieces are very rare. From the aspect of pottery profile characteristics, these pots show close similarity to those from Emporio levels X – VII, Kumtepe Ia and Ilıpınar levels VIII – VI and are therefore dated to the Chalcolithic Period[11].

10 As in: Menteşe, Aktopraklık, Fikirtepe and Pendik in the Marmara Region; Karul 2009; Bittel 1969, 19; Harmankaya 1983, 27.

11 Sperling 1976, fig. 9–11; Hood 1981, 165 f.; Thissen 2001, 82, fig. 77.3–4.

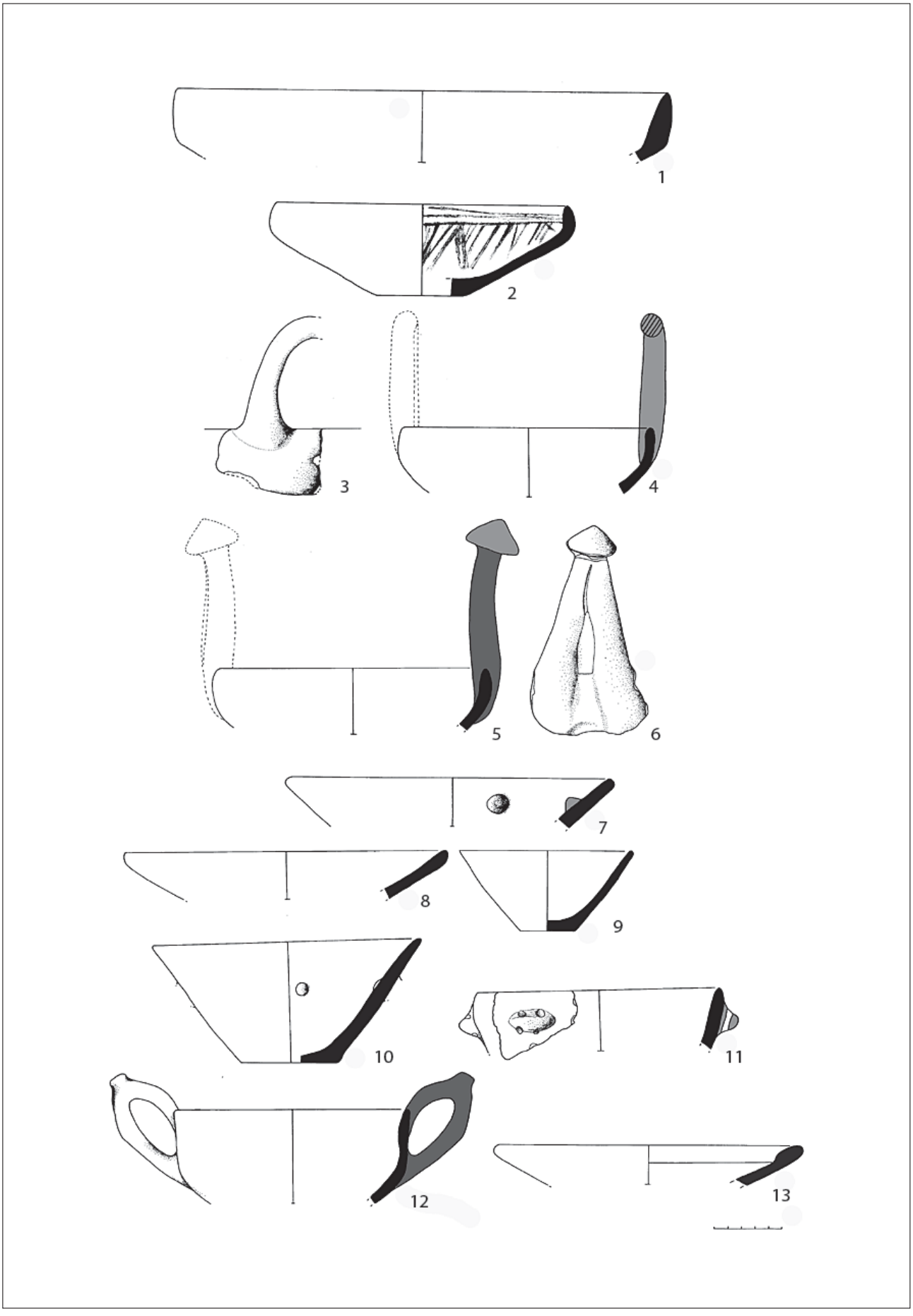


Fig. 13 Chalcolithic pottery from Yeşilova.

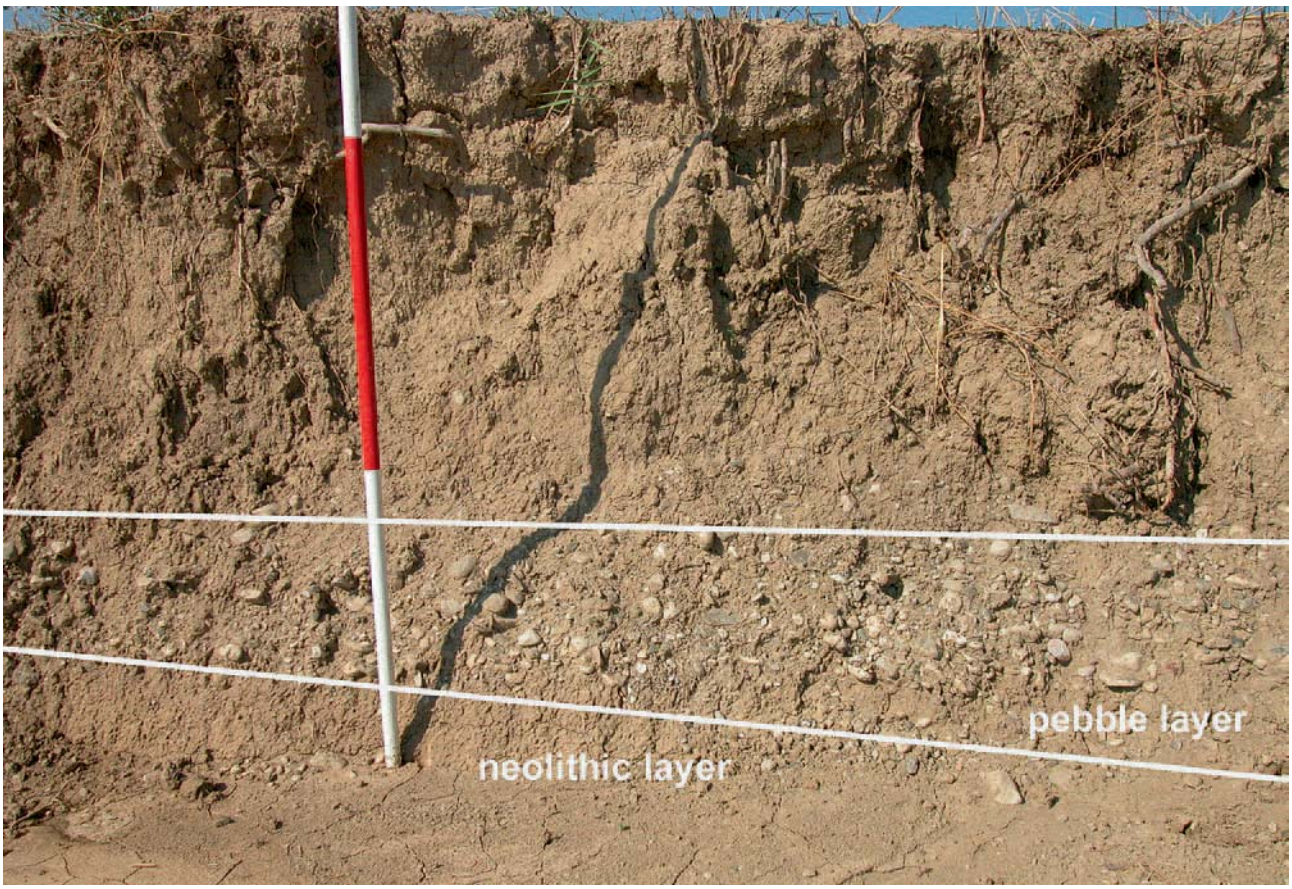


Fig. 14 Pebble layer.

Fig. 15 Neolithic level III.1.

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South-Eastern Europe

On the ›Monochrome‹ Neolithic in Southeast Europe

by Raiko Krauß

Karanovo and Hacılar – Two Pillars of Neolithic Chronology between Anatolia and the Balkans

Archaeologists often succumb to the power of images. The term ›monochrome‹ Neolithic was initially applied to pottery found in central Anatolia, a region far from the Balkans and about whose impulses for the Neolithisation of Europe very little could be stated until recently[1]. In areas in which otherwise little research has been carried out, the large and well-published excavation sites dominate our understanding of cultural development. For the Neolithic development of forms in Anatolia it was the mound of Hacılar that served as the representative stratigraphy, due to the exemplary publication of the site[2]. In the southwest Anatolian Lake District the development of mostly monochrome slipped to painted vessels can be observed, although a small amount of painted vessels were present in the ›monochrome‹ layers as well[3]. Whether this development could be generalised for western Anatolia and the Balkans as well, is questionable. It should be kept in mind that, until recently, too little was known about the network of Neolithic sites in western and northern Anatolia to enable direct comparisons of cultural spheres[4]. Therefore, in the past typological comparisons of early Neolithic material from the Balkans were determined solely along the scale of Hacılar[5].

On the other hand, for the eastern Balkans the stratigraphy of the settlement mound at Karanovo in Thrace has been an important pillar for chronology from the early Neolithic period to the Early Bronze Age. The tell became widely known when G. I. Georgiev presented the settlement stratigraphy at a conference on the Neolithic held in 1959 in Prague, a presentation that was published two years later[6]. Although since then further investigations conducted by the University of Salzburg together with the Bulgarian Institute of Archaeology have brought forth important alterations in the division of prehistoric phases of the tell[7], the system consisting of seven settlement horizons (I – VII) that Georgiev proposed in 1959 has held true essentially until today[8].

Reviewing the Karanovo stratification for the Neolithic, phases I and II represent the early Neolithic period in the eastern Balkan peninsula. Karanovo phases II/III and III stand for the middle Neolithic, which is succeeded by the late Neolithic phases Karanovo III/IV and IV[9]. This sequence develops further without any disruption into the Copper Age. That is to say, there are no signs of any greater changes in the settlement of the Thracian plain during the entire Neolithic development to the Copper Age, even when assuming that there was possibly a hiatus between phases Karanovo IV and V in Karanovo itself[10]. When such an interruption in settlement has been detectable, this particular period was present instead in other tells in the neighbourhood. It runs parallel with the first three phases of the Marica culture, as Henrieta Todorova has demonstrated[11]. It is noteworthy that the cultural development at Anatolian tell sites concludes in most cases in the middle of the 6th millennium[12], whereas the tell stratification in the Balkans starts more or less during the first half of the 6th millennium and continues into the 5th millennium[13]. A significant interruption in cultural development cannot be stated until the end of the 5th millennium, when almost all tell sites in the West Pontic area were abandoned for many centuries or permanently[14].

Monochrome Ceramics and Proto-Starčevo

The discovery of the Early Neolithic find spots at Donja Branjevina[15], Divostin[16], Krajnici[17], Poljanica-platoto[18] and Koprivec[19] made it clear, that Karanovo I does not represent the earliest Neolithic horizon in the Balkans. This could have been seen earlier, if the highly developed ceramics from the oldest layers of Karanovo had been examined. Thus, Dragoslav Srejović coined the term ›Proto-Starčevo‹ culture, based upon finds from the Iron Gate, which should precede the early Starčevo culture, and with that the phase Karanovo I as well[20]. The great geographical distance between the individual sites is still the biggest problem for the determination of a single cultural group in the period before Karanovo I or classical Starčevo cul-

1 Özdoğan 1997; Özdoğan 2006.
2 Mellaart 1970.
3 Mellaart 1970, 241–245.
4 Gérard – Thissen 2002; Schoop 2005, 305–351.
5 Nikolov 1990; Тодорова – Вайсов 1993, 15–63.
6 Georgiev 1961.
7 Hiller – Nikolov 1997; Hiller – Nikolov 2002; Hiller – Nikolov 2005.
8 Krauß 2008.
9 Николов 1998.
10 Тодорова 1986, 51 f; The more recent excavations in the north-south trench, however, suggest a continuous evolution from Karanovo IV to Karanovo V (Schlor 2005).
11 Тодорова 1986, 97–101.
12 Schoop 2005, suppl. 1.
13 Todorova 1982; Görsdorf – Bojadžiev 1996; Krauß 2008.
14 Тодорова 1986, 221–227.
15 Karmanski 1979.
16 Богданович 1987.
17 Tchohadjiev – Bakamska 1990.
18 Todorova 1990.
19 Попов 1996, 89 f.
20 Srejović 1971.

ture. Upon closer examination, the ceramics from the individual settlements are quite different. On the one hand, there are ceramic groups that display archaic white painting with dots; on the other, there are ceramic complexes with monochrome ware[21]. A simple explanation would be to recognize this as a primarily chronological difference, in the sense that the monochrome pottery predates the white painted ware. However, it has also been noted that the dissemination of the oldest cultural groups with ceramics occurred relatively rapidly over a huge area and, even more importantly, via different routes[22]. This would indicate that regional styles in ceramics emerged gradually within this broad distribution area. Yet the differences between the various regional groups are far smaller than the terms used in the respective countries might suggest. The boundary between the cultural units Karanovo, Starčevo, Criş and Körös still follows the official borders of modern states to a great extent. A possible alternative division based upon vessel typology and decoration was undertaken by J. Pavúk, who distinguished the individual regional groups of Gura Baciului, Gradešnica, Slatina, Anzabegovo-Vršnik, Gălăbnik and Podgorie[23]. Comparison of these regional groups shows, however, that although they are linked by the white painting, the one group cannot be derived from the other. And it is precisely because these groups of white-painted pottery are encountered at a fully advanced stage of development that Pavúk considers it most probable that they all developed from an older substratum, that is, an earlier phase which he sees manifested by monochrome pottery[24].

The Monochrome Neolithic in the Anatolian Lake District

It is this proposed, purely monochrome, substratum that is implied in the title of this chapter and whose explanation I shall now focus on. The absence of white painting in these ceramic complexes in comparison to the cultural stratigraphy in Anatolia is viewed as a sign of its even earlier date[25]. Problems in this methodology have been stressed repeatedly[26]. Particularly important for the pre-dating of monochrome pottery was the initially mentioned comparison with the ceramic development in Hacılar. As Lichardus-Itten and Lichardus stated, even if only monochrome ceramics were detected in a settlement with a vertical stratigraphy, this would have no historical significance[27].

Let us review the Hacılar stratification in detail. The oldest strata Hacılar IX–VI provided more than 90% monochrome pottery[28]. The few painted pieces exhibit linear red-on-cream and white-on-red decorations[29]. From Hacılar V to IIB the monochrome ceramics decrease continuously in favor of painted ware. Whereas in Hacılar V only 20% of the sherds are painted, in Hacilar IIB their share increases to 60%. In Hacılar I the proportion of the painted pottery amounts to as much as 70%[30]. The temporal relationship between the sequence in Hacılar and the early Neolithic in southeastern Europe cannot be regarded as finally resolved, since the available ^{14}C dates from the Anatolian Lake District are from old measurements made in the pioneering days of the radiocarbon dating method[31]. Nevertheless, both the comparison of data from Hacılar with recent measurements in the region[32], as well as the typological comparison with sites dated in recent times[33], makes the parallelization of both areas possible. Accordingly, the predominantly ›monochrome‹

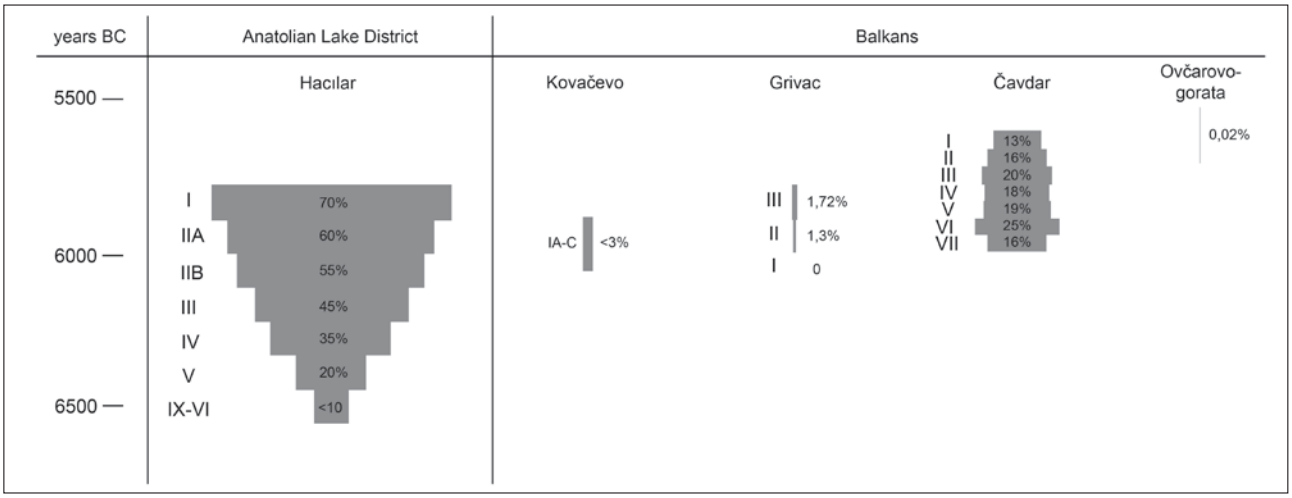

Fig. 1 Comparison of the proportion of painted ceramics between SW-Anatolian Lake District and different Early Neolithic sites in the Balkans.

21 Agathe Reingruber rightly points to the totally inadequate deffinition of the term ›monochrome‹ ceramic by the example of the Early Neolithic in Greece. Cf. Reingruber, this volume.
22 Lichardus-Itten – Lichardus 2003.
23 Pavúk 1993.
24 Pavúk 1993, 234.
25 Тодорова – Вайсов 1993, 61 f. 74; Чохаджиев 2007, 87.
26 Stefanova 1996; Lichardus-Itten et al. 2002, 118. The most radical in this context certainly Lichardus-Itten – Lichardus 2003, 63–66; see also Krauß 2006, 63 f; Krauß 2008, 119–121.
27 Lichardus-Itten – Lichardus 2003, 64.
28 Mellaart 1970, 100 tab. 155.
29 Mellaart 1970, 102–109.
30 Mellaart 1970, 100 tab. 155.
31 Mellaart 1970, 92–95.
32 http://www.canew.org.
33 Schoop 2005, 149–196.

phase in Hacılar ends before the advent of the first pottery in the Balkans (Fig. 1). Explicitly, just the horizons Hacılar V to I, which are dominated by painted ceramics, can be seen as approximately contemporaneous with the Bulgarian Early Neolithic.

Development of Ceramics in Western Anatolia

The specific alteration of ceramic styles in the Anatolian Lake District, as we have seen, cannot even be easily transferred to western Anatolia. It becomes evident that the hinterland of İzmir gave decisive impulses to the Marmara area, which is geographically closest to the Balkans and therefore also of ultimate importance for the onset of Neolithisation in Southeast Europe.

The Neolithic-Chalcolithic cultural sequence in the İzmir region is best determined in the mound of Ulucak, situated about 20 km east of the harbour town[34]. Excavations conducted at the tell since 1995 have revealed 22 superimposed settlement layers thus far[35]. The excavations continue to expose yet older cultural deposits on the mound. The lowermost layers Va – f and IVa – k represent for the most part an uninterrupted development from the Neolithic to the early Chalcolithic period. After a notable disruption in settlement the hill was inhabited once again in the middle Chalcolithic (Ulucak III), then, following a significant interruption, again in the Early Bronze Age (II) and in Roman-Byzantine times (I). The distinguishing criterion between the layers Ulucak V and IV is a change in building traditions, that is, from wooden-post-and-mud structures in layer V to only clay brick buildings in IV[36]. The ceramic material from the Neolithic layers Ulucak Vf – a is characterized by round shapes with only a slight profile, amongst them bowls with an S-profile, tall slender pots with in-curving or slightly tulip-shaped walls and a hitherto singular form, the so-called red-cross bowl. The bases of vessels are typically low and offset from the lower body. Perforated tunnel-shaped lugs and simple pierced knobs served as handles or grips[37]. Further, the complete absence of ware with impressed decorations is conspicuous. This delimitation to Neolithic layers is underlined by the appearance of impressed ware in Ulucak Va[38]. Long as well as short perforated tunnel lugs and smaller pierced knobs are still in evidence. They are joined by pottery painted in red-on-cream ground and in cream-on-red ground; this pottery however makes up only a very small proportion of the total spectrum[39]. The spectrum of forms in Ulucak IVd – c is very similar to that in the lower lying layers, although the profile of some is less distinct. A new form is found in large pots, whose funnel-shaped neck is markedly attached to the shoulder[40]. Red-on-cream painting is still customary. In general, however, painting on vessels plays a subordinate role in the İzmir region; namely, in all of the layers only a decreasing amount of pottery is painted. Former vessels with separate funnel-neck develop in Ulucak IVb – a into pots with closed neck or with a cylindrical neck that is clearly separate from the shoulder. Some of the vessels have small knobs directly below the greatest diameter of the body. Vessels with an oval form now appear quite frequently. Furthermore, pottery with an oval-shaped base is also attested in Ulucak IVb – a, a detail that can be observed in pottery of the developed early Neolithic in Bulgaria[41]. It differs essentially from the Bulgarian material through the absence of a distinctly higher foot or even a proper stand, as found in great numbers in the north. By contrast, bases in Ulucak IVb – a are either simply flattened or a slightly raised ring-base[42]. On the whole, the impression arises that only the directly preceding development of Ovčarovo-gorata/Karanovo II is tangible in Ulucak IVb – a. Thus, no actual parallels can be drawn, for a greater hiatus follows in Ulucak, which would correspond with the settlement horizon in question.

It is remarkable that in Ulucak the technique of applying a slip to vessels is evidenced from the very beginning, though red-slipped wares do become increasingly numerous in the course of the Neolithic-Chalcolithic development[43]. In view of the cultural sequence in the southern Marmara region, the oldest package of layers Ulucak Vf – a should be linked with the lower deposits of Menteşe 3 or ›archaic Fikirtepe‹. A series of radiocarbon ages places this development around 6400–6200 cal BC as such we find ourselves on the very brink of Neolithisation in the eastern Balkans. The early Chalcolithic deposits relate to the time immediately before 6000. They can be linked with Ilıpınar X, and likely correspond with the Proto-Starčevo horizon in the central Balkans. Thus, in northern Bulgaria we can compare finds from Poljanica-platoto with the oldest material from Koprivec and finds from Džuljunica 1. Džuljunica 1 and Ulucak IVk – e are also linked by wares with a cream slip, which appears at both sites (Fig. 2, 3–4). With that, it is clear that only Ulucak IVd – c can be synchronized with Karanovo I. This correlation is supported foremost by the connection of Ulucak IVb – a with some of the material from Ovčarovo-gorata, which corresponds to the Karanovo II horizon in Thrace. Yet an intermediate link on the way to the north is provided by Ilıpınar VII – VI, which itself can be associated with Ulucak IVb – a. Indicators for this parallel are vertical handles below the rim, as found at both sites in this horizon[44]. Hence, it becomes quite clear that a direct connection of the horizon Ovčarovo-gorata/Karanovo II in the eastern Balkans with Ulucak is hardly possible, if not just for the reason that the time span in question, Ilıpınar Va, and above all Ilıpınar Vb, is not attested in Ulucak.

Finds known from Ege Gübre, a site located 40 km north of İzmir and right on the Aegean coast, can be linked with

34 Çilingiroğlu 2009.
35 Çilingiroğlu – Abay 2005; Çilingiroğlu – Çilingiroğlu 2007.
36 Çilingiroğlu 2009, 48–51.
37 Çilingiroğlu – Çilingiroğlu 2007, fig. 24–25.
38 Çilingiroğlu 2009, pl. 4, 11.
39 This is represented by three sherds (= 1 %) (Çilingiroğlu 2009, 180).
40 Çilingiroğlu – Çilingiroğlu 2007, fig. 9, second vessel above right.
41 For example, finds from the Struma Valley (Чохаджиев 2007, fig. 6, 3. 13) and material from Ovčarovo-gorata in northern Bulgaria (Krauß forthcoming a).
42 Cp. Çilingiroğlu – Çilingiroğlu 2007, fig. 6. 9.
43 Personal communcation from Çiler Çilingiroğlu.
44 Cp. Thissen 2001, fig. 61, 1–2.

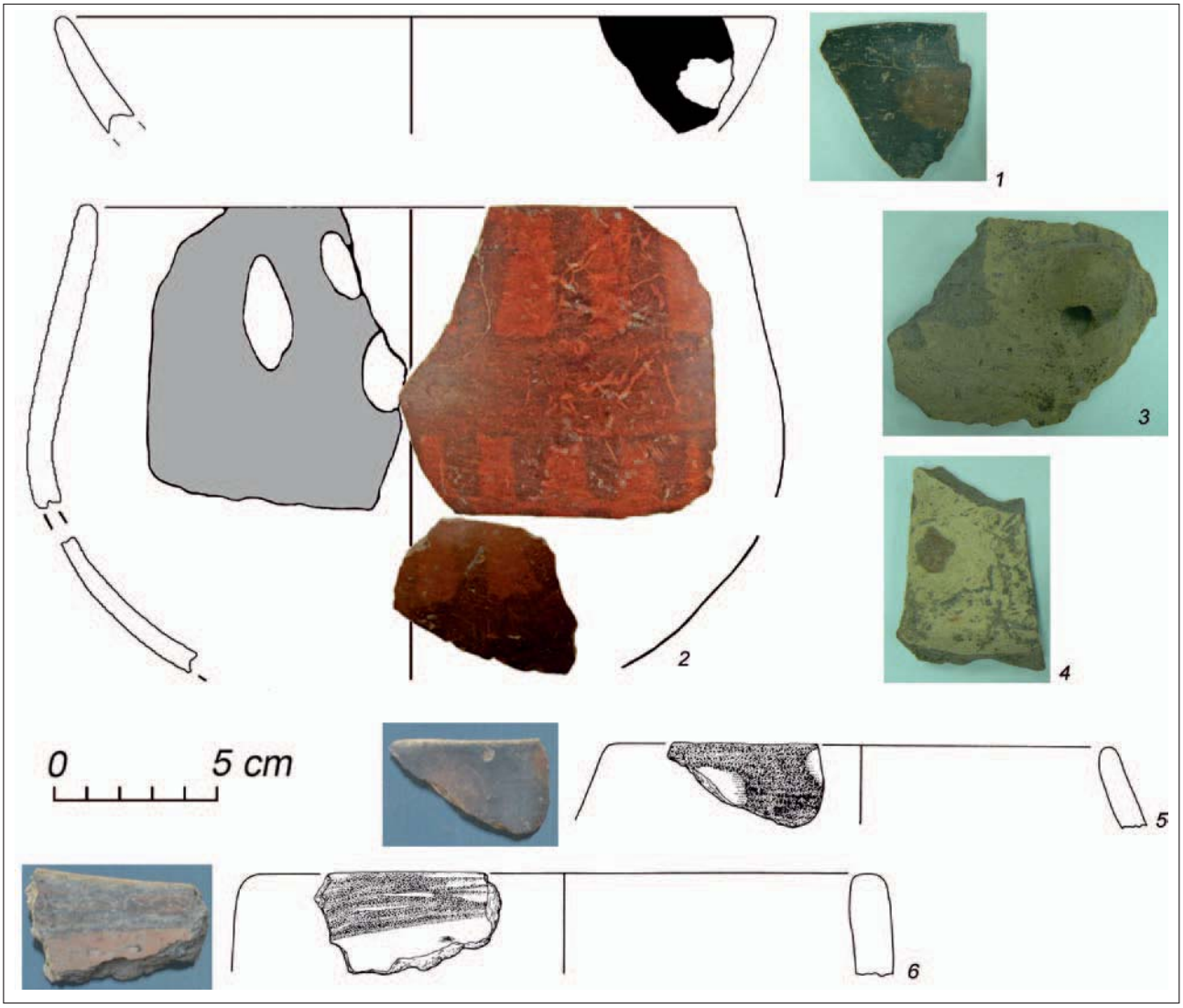

Fig. 2 Fragments of Early Neolithic pottery from the oldest layers 1 and 2 of Džuljunica. 1–2. 5–6 brown slipped ceramics with painting in darker brown color. 3–4 fragments of crème slipped pottery. Photos Nedko Elenski, drawings Raiko Krauß.

the late Neolithic-early Chalcolithic material from Ulucak[45]. It includes forms with long tunnel-shaped, perforated lug handles and strongly stylized renditions of caprid heads applied to the vessel surface[46]. There is a notably large proportion of impressed ware[47], as well as many fragments with a red slip. The lack of complete forms makes an exact comparison with the sequence in Ulucak quite difficult. Nonetheless, if the appearance of ware with impressed decoration and thickened rims as well as numerous fragments with a red slip are used as criteria, then a parallel with Ulucak IVk–e until at least IVd–c is possible[48].

The cultural sequence of the mound of Yeşilova, situated on the western periphery of the city of İzmir, probably begins somewhat earlier. The lowermost level III, constituted by a total of eight single layers, can be assigned to the Neolithic and early Chalcolithic periods[49]. Represented in the oldest layers in Yeşilova III8–6 are dark and red polished wares. Wares with impressed decoration, on the other hand, are not present as yet. As of Yeşilova III5–3 red polished ware dominates the inventory[50]. Only in the uppermost layers, Yeşilova III2–1, does impressed decoration appear, which allows a parallelization with Ulucak as of layers IVk–e. The material in the layers Yeşilova III8–3 is correspondingly older and parallel at least in part with Ulucak V.

Material from the mound at Dedecik-Heybelitepe, some 35 km south of İzmir and on the western margin of the plain of Torbalı, is more likely to be linked with one of the Chalcolithic layers in Ulucak[51]. The early Chalcolithic period is encountered in a relatively thin settlement layer, which lies directly upon the native rock and is superimposed by a layer of the late Chalcolithic and by Early Bronze Age graves. Known forms include plump pots with in-curving rim, vessels

45 Sağlamtimur 2007.
46 Sağlamtimur 2007, fig. 6 b; 7.
47 Sağlamtimur 2007, fig. 8–9.
48 Radiocarbon dates for Ege Gübre correspond with the time span 6200–6000 cal BC (Sağlamtimur 2007).
49 Derin 2007.
50 Derin 2007.
51 Lichter – Meriç 2007; Herling et al. 2008.

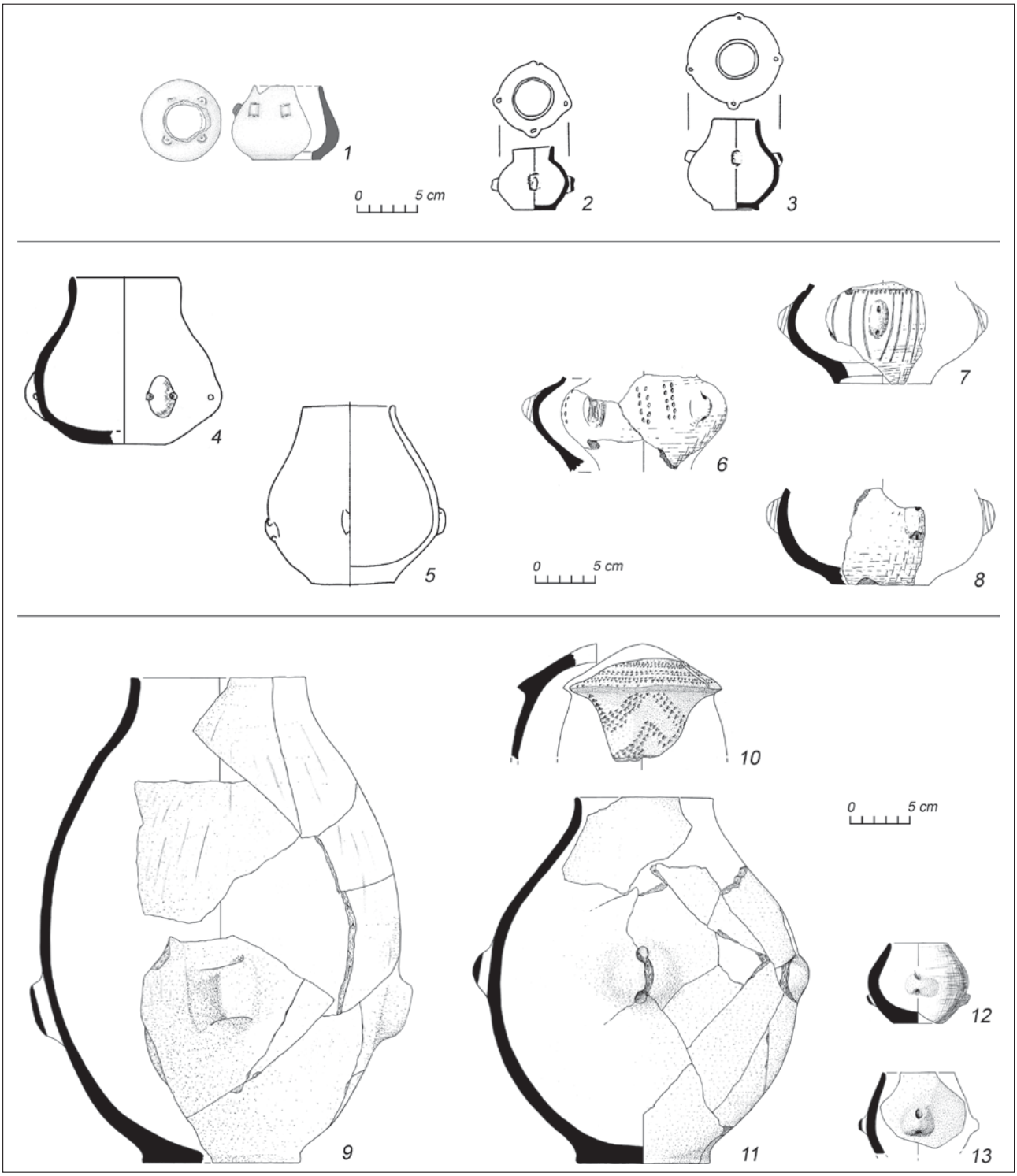

Fig. 3 Globular pots with loops from Early Chalcolithic sites in west Anatolia and Early Neolithic sites in the Balkans. 1 Çukuriçi VIII. 2–3 Ulucak IVb2. 4 Džuljunica 2. 5 Poljanica-platoto. 6–8 Koprivec. 9–13 Ovčarovo-gorata. 1 after Galik – Horejs, this volume fig. 6; 2–3 after Çilingiroğlu et al. 2004, fig. 25, 27–28; 4 after Еленски 2006; 5 after Todorova 2003.

with funnel-shaped rim, and probably also bowls as well as vessels with S-shaped profiles[52]. The appearance of impressed decoration and long perforated tunnel-handles, pseudo perforations and various vase feet is diagnostic, raising thoughts of a parallelization with the upper layers of Ulucak IV.

Comparable material originates in phase VIII in Çukuriçi Höyük too, a site in the hinterland of ancient Ephesos[53]. Amongst the finds are red slipped globular pots with straight walls or with an S-profile[54]. Long perforated tunnel-handles and impressed sherds are likewise found there. The excavator

52 Herling et al. 2008, 21; fig. 4–5.
53 Horejs 2008a; Horejs 2008b.
54 Horejs 2008b, fig. 5.

Barabara Horejs compares the globular pot with a gradually narrowing conical mouth and four vertical loops on the upper body, among others, with two small globular pots from the upper layers of Ulucak IV, although their rim is slightly offset[55]. Nevertheless, a date in the Anatolian late Neolithic-early Chalcolithic can be assumed with certainty.

Comparable forms of this time horizon are known in northern Bulgaria, for instance, in Koprivec[56], Poljanica-plato-to[57] and Džuljunica 1[58] (Fig. 3). Yet the Balkan examples stand out through the marked low position of the pierced knobs or lugs, which is always below the largest diameter of the vessel's body. By contrast, pottery from the İzmir region always

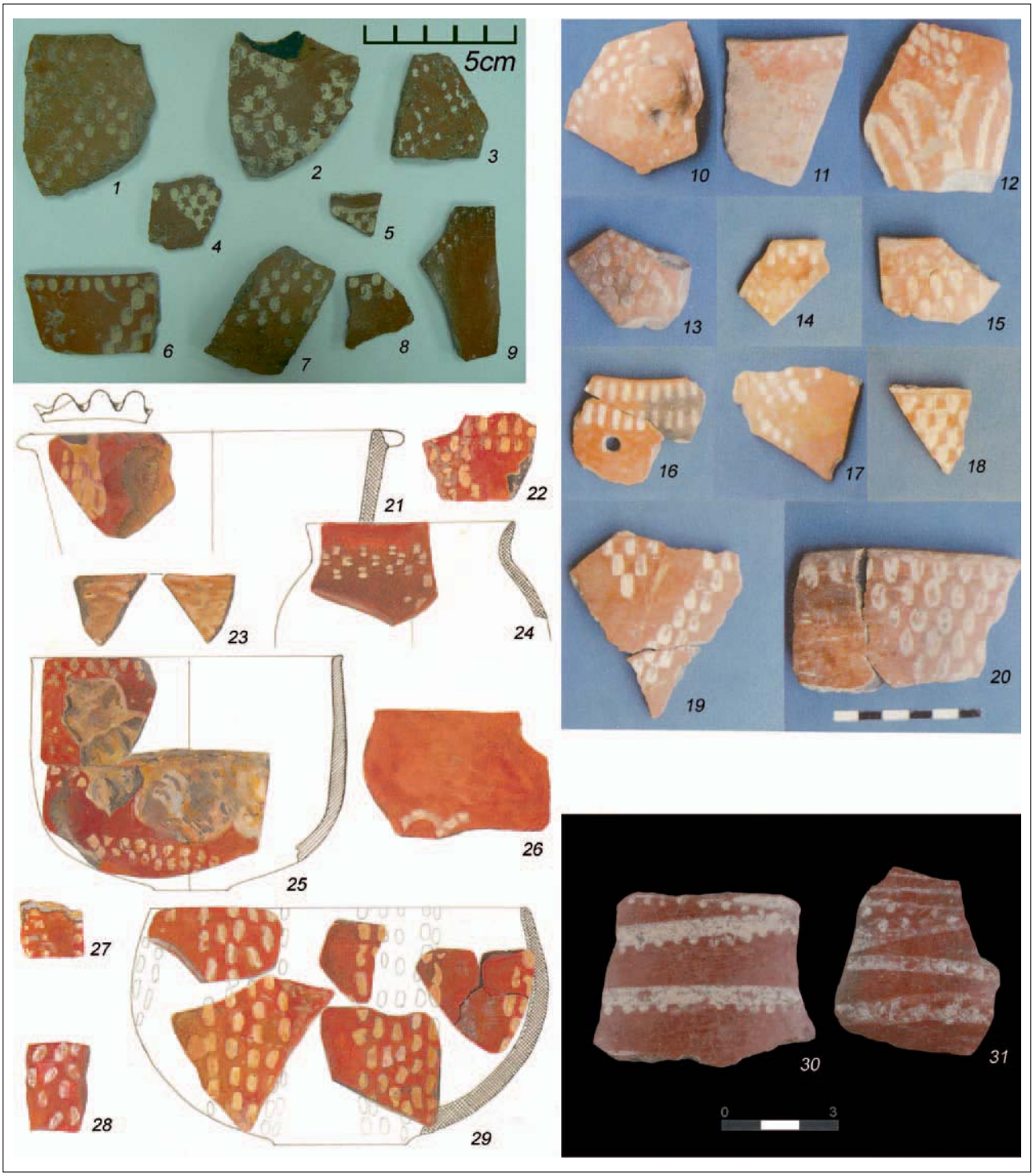

Fig. 4 Early Neolithic fragments of red slipped pottery painted with white dots from the Balkans and the Carpathian Basin. 1–9 Džuljunica 2. 10–20 Donja Branjevina. 21–29 Gura Baciului. 30–31 Aşağı Pınar. Differend scale. 1–9 photo Nedko Elenski; 10–20 after Karmanski 1979; 21–29 after Lazarovici – Maxim 1995; 30–31 after E. Özdoğan, this volume, fig. 11.

55 Horejs 2008a, fig. 14.
56 Krauß 2006, pl. 5, 3.
57 Тодорова – Вайсов 1993, fig. 53, 6.
58 Елински 2006, fig. 7, 3.

bears pierced knobs or tubular lugs on the upper part of the body. The longevity and wide dissemination of these forms in the north are attested by very similar examples found in Starčevo[59], Goljamo Delčevo I[60], Drinovo[61], Samovodene A[62] and Jabălkovo[63]. Further, it is noteworthy that among the material in Çukuriçi are some fragments of red slipped pottery painted with white dots[64], a decorative technique typical of the Balkan early Neolithic. It is found, for example, in the lowermost layers in Aşağı Pınar[65], in Kărdžali[66], Džuljunica 2[67], Grivac II[68], Donja Branjevina II[69] and among the oldest material in Gura Baciului[70] (Fig. 4). Thus, the oldest find sequence detected at Çukuriçi Höyük so far probably evidences the time horizon at the beginning of white painting in the Balkans at the turn from the 7th to the 6th millennium BC. The presence of pottery with white painting over the entire surface prior to white-dot painting is attested solely in Macedonia. There the dot decoration is characteristic of the phase Anzabegovo-Vršnik Ic, according to M. Garašanin[71], and can be paralleled without difficulty with the aforementioned sites in the eastern and northern Balkans.

Monochrome Ceramic in the Marmara Region

It is noteworthy that the few sites known so far in the Marmara region, even those dated to the Chalcolithic period (i.e., after 6000 cal BC), display a ceramic inventory that is predominantly monochrome. For this reason it seems less sensible to single out a monochrome phase from the whole development.

The sites of Fikirtepe and Pendik on the west coast of the Sea of Marmara are among the longest known Neolithic settlements in Turkey[72]. Both lie within the Asian side modern-day metropolis of Istanbul. Based on the finds from both sites, M. Özdoğan defined the Fikirtepe culture, which encompasses a large part of the early Neolithic and Chalcolithic development in the southern Marmara region[73]. According to his definition, the ›archaic Fikirtepe‹ represents the oldest ceramic-using culture in the region. Moreover, Özdoğan and I. Gatsov argue for the presence of an even older aceramic Neolithic culture in Çalca and Musluçeşme[74]. Characteristic forms of ›archaic Fikirtepe‹ are spherical bowls with a straight or slightly out-curving rim and globular pots with internal rim joint[75]. This phase is succeeded by the ›classical Fikirtepe‹ culture, distinguished by forms mainly with an S-shaped profile and rectangular box-like vessels[76]. All of the pottery has a monochrome slip, and some vessels are decorated with incised lines that compose grid-filled triangles, rhombi and rectangles. The late phase of this culture, dubbed the ›developed Fikirtepe‹, is not represented in Fikirtepe itself or in Pendik. Here Özdoğan draws the layers Ilıpınar VIII and Yarımburgaz 4 as well as some of the materials from Demircihüyük in reference[77]. The material from Fikirtepe und Pendik long held an isolated position in research, for it could be compared typologically only in general with the Balkan early Neolithic. Overall, it is probably somewhat older than the earliest Neolithic settlements in southeastern Europe.

Three Neolithic burials can be assigned to ›classical Fikirtepe‹; they were discovered at Barcin Hüyük, located south of Lake Iznik[78]. They comprise the graves of a young adult, an older woman and another woman, the last likely a secondary burial. Among the grave goods are several fragments of box-shaped vessels as well as pots and bowls with an S-profile or straight walls, all of which can be linked with finds from Fikirtepe and Pendik[79]. Two radiocarbon ages for the graves point to the second half of the 7th millennium BC[80], a time either immediately before or at the absolute beginning of Neolithisation in the Balkan region.

Nevertheless, excavations at the hill of Ilipinar on the west shore of Lake Iznik ultimately provided the key to understanding the cultural development in the Marmara region: Based upon its long stratigraphic sequence, the many rather short-lived settlements in the region could be assigned a place with the relative chronology[81]. The succession of forms in Ilıpınar is even relevant for areas north of the Sea of Marmara, as it can be corrected by layers in the Yarımburgaz cave[82]. The layers in Ilıpınar are designated with Roman numerals, of which strata X – V pertain to the Neolithic and Chalcolithic deposits. The lowest stratum Ilıpınar X displays globular forms with an out-curving rim[83]. The vessels' surface is smoothed both inside and outside. A decisive distinction can be made between grey-brown and light brown ware. The clay was strongly tempered with organic matter, yet the sherd has a remarkable hardness through firing. Pierced pointed knobs, which often point upwards, served as handles. Variants display flat, disc-shaped lugs, which are perforated in the centre. These bend upwards as well[84]. In general, Ilıpınar X can be linked with the material in Fikirtepe and Pendik, whereby it becomes clear that this is a phase that precedes the oldest Neolithic in the Balkans.

59 Benac 1979, pl. XVII, 2–3. 4.
60 Тодорова et al. 1975, pl. 4, 5.
61 Тодорова – Вайсов 1993, fig. 117, 10.
62 Станев 2002, fig. 138, left.
63 Leštakov et al. 2007, fig. 10, 9.
64 Cf. Horejs, this volume.
65 Finds from the older layers 7–8 in the University in Istanbul. My thanks go to Mehmed Özdoğan for providing me with the possibility of studying the materials.
66 Николов 2002, pl. 134, 2.
67 Еленски 2006, fig. 9, 6.
68 Bogdanović 2004, fig. 95 a. c; 96 a. e. g.
69 Benac 1979, pl. XXXVIII, 1–3.
70 Lazarovici – Maxim 1995, colour pl. I; Ciută 2005, pl. XVI.
71 Garašanin 1998, fig. 5 a. e.
72 Janse 1925; Bittel 1969; Özdoğan 1983; Özdoğan 1999, 207.
73 Özdoğan 1983; Özdoğan 1999, 213 f.
74 Özdoğan – Gatsov 1998.
75 Özdoğan 1999, fig. 5 above.
76 Özdoğan 1999, fig. 5 below.
77 Özdoğan 1999, 213.
78 Roodenberg et al. 2008.
79 Cp. Roodenberg et al. 2008, fig. 6–7.
80 Roodenberg et al. 2008, 62.
81 Roodenberg 1995; Roodenberg – Thissen 2001; Roodenberg – Alpaslan Roodenberg 2008.
82 A representative selection of finds is kept in the University of Istanbul.
83 As – Wijnen 1995, 94 f; Thissen 1995, 109 f; Thissen 2001, fig. 4–12.
84 Thissen 1995, fig. 1; Thissen 2001, fig. 4–5.

A continuation of these forms can be seen in Ilıpınar IX. Moreover, now vessels with a distinct attachment of the neck to the shoulder are attested[85]. Of major significance here is the appearance of initially only very few fragments of hitherto unknown pottery with impressed decoration. The impressions comprise coarse incisions, obviously made with the fingernail, which cover the entire vessel surface except for the rim. As in Ilıpınar IX, temper with organic matter is no longer observed; the ceramic spectrum consists solely of wares with mineral temper. In Ilıpınar VIII there is a notable increase in pottery with impressed decoration[86]. As before, globular forms with an out-curving rim and vessels with a cylindrical neck predominate[87]. Not until the material from Ilıpınar VIII do we encounter all of those elements that are characteristic of the oldest ceramic complexes in the Balkans. Analogies in northern Bulgaria would be, for example, the older material in Koprivec and forms from Poljanica platoto. However, during this phase there is the additional appearance of characteristic Yarımburgaz pottery with incised decorations, which is otherwise scarcely found in Bulgaria[88]. On the whole, the ceramic spectrum in sites around the Sea of Marmara displays a great abundance of types and variants; the impression arises that only few types from this profuse inventory reached the north. A decoration that is specific to Yarımburgaz pottery is observable in the north solely on the three- and four-foot bowls; it remains an exception on pottery.

Small knobs positioned just below the vessel rim of closed forms are characteristic in Ilıpınar VII[89]. Pierced pointed knobs are still present, but they are seldom pointed upwards. Vertical pierced knobs and handles are also attested, among them pointed, elbow-shaped examples. This horizon is typified by pointed, sharp-edged impressions, which were imprinted into the well smoothed surface[90].

The red slip appears in Ilıpınar VI, which is so characteristic for the Balkan early Neolithic. Likewise typical is the wide incised decoration, the incised lines of which are evenly smoothed[91]. Concentric arches, positioned on the widest part of the body, predominate among the motifs[92]. Small bosses sit directly upon the vessel rim[93]. Forms from Ilıpınar Va correspond largely with those in layer VI. However, globular vessels with a narrow opening or cylindrical neck now have ribbon handles that join the body or the shoulder[94]. Furthermore, numerous bowls with slightly in-turned rims are attested[95]. Polished incised decoration with single arch motifs is still common[96].

With Ilıpınar Vb the stage is finally reached that corresponds with the developed early Neolithic period in Bulgaria[97]. This is demonstrated foremost by the appearance of characteristic, very fine channelled decoration, which is determinative for the horizons Karanovo II and Ovčarovo-gorata in the North[98]. In Ilıpınar wide plump forms are instead more frequent, although this horizon in the eastern Balkans is characterized by slender beaker forms. Direct analogies are found in the large plump vessels with narrow conical neck and handles or grips attached to the sides, which already appeared in Ilıpınar Va; similar forms appear in the developed early Neolithic in Bulgaria[99].

The development already determined in Fikirtepe and Pendik, which precedes that in the tell of Ilıpınar, can be traced again south of Lake Iznik at Menteşe[100]. There the third and oldest settlement layer was divided into a lower, middle and upper settlement level by the excavator J. J. Roodenberg[101]. This layer reflects as a whole the development from the so-called archaic to classical Fikirtepe[102].

If we accept that the appearance of the earliest ceramic complexes in southeastern Europe is parallel to Ilıpınar VIII at the earliest, then the entire development of phase Menteşe 3 must have taken place prior to that time. Ulf Schoop links the upper level of Menteşe 3 with Ilıpınar X. It is indeed significant that in the otherwise purely monochrome-ceramic milieu of Menteşe 3 a few sherds with painting already appear[103], a situation that leads to renewed doubt about the existence of a monochrome-ceramic horizon at the beginning of the Neolithisation of the Balkans. Following a considerably lengthy hiatus in settlement that is designated Menteşe 2, the site was settled again only later in the developed Chalcolithic period. Finds of carinated bowls with characteristic wide incised motifs in the form of arches and of triangular angles, one set in the next, allow parallels to be drawn between Menteşe 1 and Ilıpınar Va[104].

Since 2004 the University of Istanbul together with the Archaeological Museum in Bursa have carried out excavations at the complex, multi-layered site of Aktopraklık, near the community of Akçalar, some 25 km west of Bursa and on the shore of Lake Ulubat[105]. The site is constituted by a Chalcolithic flatland settlement (A), a Chalcolithic tell (B) with at least four levels, and a further multi-layered Neolithic settlement (C), which is superimposed by a Chalcolithic cemetery[106]. According to the excavator, Necmi Karul, the site displays the following stratigraphy: The finds of the apparently single-layer Aktopraklık A can be correlated with Ilıpınar Va. Aktopraklık B, adjoining to the north, is evidently associated with Aktopraklık A, but is superimposed by layers containing Ilıpınar-Vb material and at the top by a severely mixed horizon. Finds of material found at the foot of this tell

85 As – Wijnen 1995, 95; Thissen 1995, 110 f; Thissen 2001, fig. 21–22.
86 Thissen 2008, fig. 26–27.
87 As – Wijnen 1995, 95; Thissen 1995, 111; fig. 3.
88 Thissen 2001, fig. 30, 4; 45–46.
89 Thissen 2001, fig. 61, 3–5.
90 Thissen 2001, fig. 65, 6.
91 Thissen 2001, fig. 64, 2–5.
92 E. g. Thissen 2001, fig. 62, 15.
93 As et al. 2001, fig. 7, 6–9.
94 Thissen 2001, fig. 72, 4; 73, 5; 74, 1. 5.
95 Thissen 2001, fig. 75, 11; 76, 1–3; 77, 3–5.
96 Thissen 2001, fig. 70, 2; 71, 2–3; 76, 3; 77, 5.
97 According to available absolute dates, the time is about the middle of the 6th millennium cal BC (Thissen 2008, fig. 10).
98 Thissen 2008, fig. 5, 1. 3–5. 7; 8, 6–7; 9, P26. P29.
99 E. g. in Ovčarovo-gorata (Krauß forthcoming a).
100 Roodenberg 1999; Roodenberg et al. 2003.
101 Roodenberg et al. 2003, 19 f.
102 Cp. Schoop 2005, 206.
103 Roodenberg et al. 2003, fig. 17, 7.
104 Roodenberg 1999, fig. 12, 7–14; 13, 7.
105 In 2006 I had the opportunity to visit the ongoing excavations in Aktopraklik. Here I wish to thank the head of excavations, Necmi Karul, for information about the current work and results as well as the opportunity to study some of the finds in the excavation house in Akçalar and in Istanbul.
106 Karul 2006; Karul 2007a; Karul 2007b.

that can be linked with Ilıpınar VIII allow the assumption of an older settlement, which however has not yet been sufficiently investigated. From this layer derive some vessels whose characteristic incised decoration correlates them with Yarımburgaz[107]. Somewhat distant from the tell lies the cemetery that belongs to the Chalcolithic settlement, underneath which a Neolithic settlement (Aktopraklık C) with at least two layers is located, and which Karul connects with Ilıpınar IX–X, i.e., ›archaic Fikirtepe‹. Many of the finds from later layers in Aktopraklık B display similarities with the material from Ovčarovo-gorata. They account for more than the finds from Ilıpınar Vb itself, as hardly any pottery with impressed decoration is known from the latter. Even though the number of sherds with impressed décor had already decreased, compared with the Balkan early Neolithic, they are nonetheless still numerous in the material from Ovčarovo-gorata. Hence, the absence of impressed sherds amongst Ilıpınar-Vb material presents a problem for the parallelization of both sites.

The material from Aktopraklık B now contains those elements that in Ilıpınar Vb are viewed as similar to elements in Ovčarovo-gorata (see below) as well as wares with impressed decoration in sufficiently large numbers. In addition, a decoration composed of wide incised bands, filled with small pointed imprints[108], also emerges in Aktopraklık B; it is likewise evidenced in the north.

Neolithic material is also known from the Troad, through occasional finds gathered in Coşkuntepe[109], which Jürgen Seeher connects with layers IX–VI in Hacılar[110]. They are various pots with a red slip, with an in-turned or a slightly S-shaped out-curving rim, some with a thickened rims as well as long perforated tunnel-shaped handles[111]. The pottery has mineral temper only. Although here Seeher recognizes a clear connection with forms in southwestern Anatolia, and strictly delimits it from the Fikirtepe group in the north, there are nevertheless formal similarities to pots in Menteşe 3[112], which do not contradict the parallel with the cultural sequence in the Anatolian Lake District, but – on the contrary – even confirm it. The tiny fragment of a box-shaped vessel found in Coşkuntepe also points towards a link with Fikirtepe[113].

Similar material was gained in a survey near the community of Uğurlu, located in the west of the island of Gökçeada/Imbros[114]. These fragments are likewise covered with a red slip, but some have a black slip. The short and also extremely long tunnel-shaped handles as well as some fragments with an out-turned rim are strongly reminiscent of early Chalcolithic finds in the İzmir region[115]. However, no black-polished ware has been documented in the area of İzmir[116]. This specific kind of surface treatment links rather with the older layers in Hoca Çeşme.

Anatolian Ceramics in the Balkans?

As we will see, the concept of painting ceramic vessels seems to have been known in southeastern Europe from the very beginning, even though the amount of painted pottery was initially very small. One of the first find complexes with ›monochrome pottery‹ known in Bulgaria stems from Poljanica-platoto, a site in the district of Tărgovište[117]. This complex was discovered during a field survey conducted by Henrieta Todorova together with other colleagues in 1972. Regular excavations at the site were not carried out; at least no excavation documentation was made known. However, seven vessels found during these investigations were published[118]. Except for the two globular pots, all of the vessels are covered with a red clay slip. Especially remarkable is the impressed decoration on one particular jar[119] showing a technique used in Western Anatolia only after the end of the monochrome phase in the Lake District.

Test excavations conducted by Volodja Popov near the village of Koprivec, in an area that slopes down to the Baniski Lom, comprised three trenches that cannot be connected stratigraphically[120]. They brought forth a cultural sequence that spans the early to the late Neolithic. The opinion at that time was that at Koprivec a stratigraphical division between pure monochrome and white-painted pottery could be distinguished for the first time[121]. In trench B, relevant to the early Neolithic, Popov discovered a settlement of the early Neolithic comprising a total of four successive layers. However, the archaeological material found in these layers was presented all together and not according to individual layers. Later examination of the material revealed a large number of white-painted sherds from vessels that cannot be differentiated typologically from the presumably older, monochrome vessels[122]. Also problematic is the small size of the excavated surface, for it cannot be excluded that the absence of painted pottery in the oldest layer in Koprivec is merely due to chance excavation circumstances.

107 Karul 2006, fig. 126 above; Karul 2007a, fig. 6.
108 Karul 2007a, fig. 5 lower left.
109 Seeher 1990; Takaoğlu 2005.
110 Seeher 1990, 11–14.
111 Seeher 1990, fig. 1.
112 Cp. Roodenberg et al. 2003, fig. 12, 1–4; 13–14.
113 Seeher 1990, fig. 1, 22.
114 Erdoğu 2003, 16 f.
115 Erdoğu 2003, fig. 4.
116 Personal communication from Çiler Çilingiroğlu.
117 Todorova 1989, 11 f; Todorova 2003, 83.
118 Todorova 1989, pl. 2; Todorova 2003, fig. 1.
119 Todorova 2003, fig. 1, 2.
120 Попов 1996, fig. 2; Krauß 2006, 161 f.
121 Попов 1996, 34–38; Todorova 2003, 83.
122 Stefanova 1996; Krauß 2006, 184 f.

Early Neolithic Development in the Struma River Valley

A good example of the relationship between painted pottery and monochrome ware can be seen in the large-scale excavated settlement at Kovačevo in the Struma river valley[123]. Although a broad spectrum of white-painted forms is present among the ceramics, its proportion in relation to the entire ceramic material amounts to no more than 3 %. Thus, when a trench of only a small size is opened, it is quite probable that no painted pottery will be found. This is a factor that

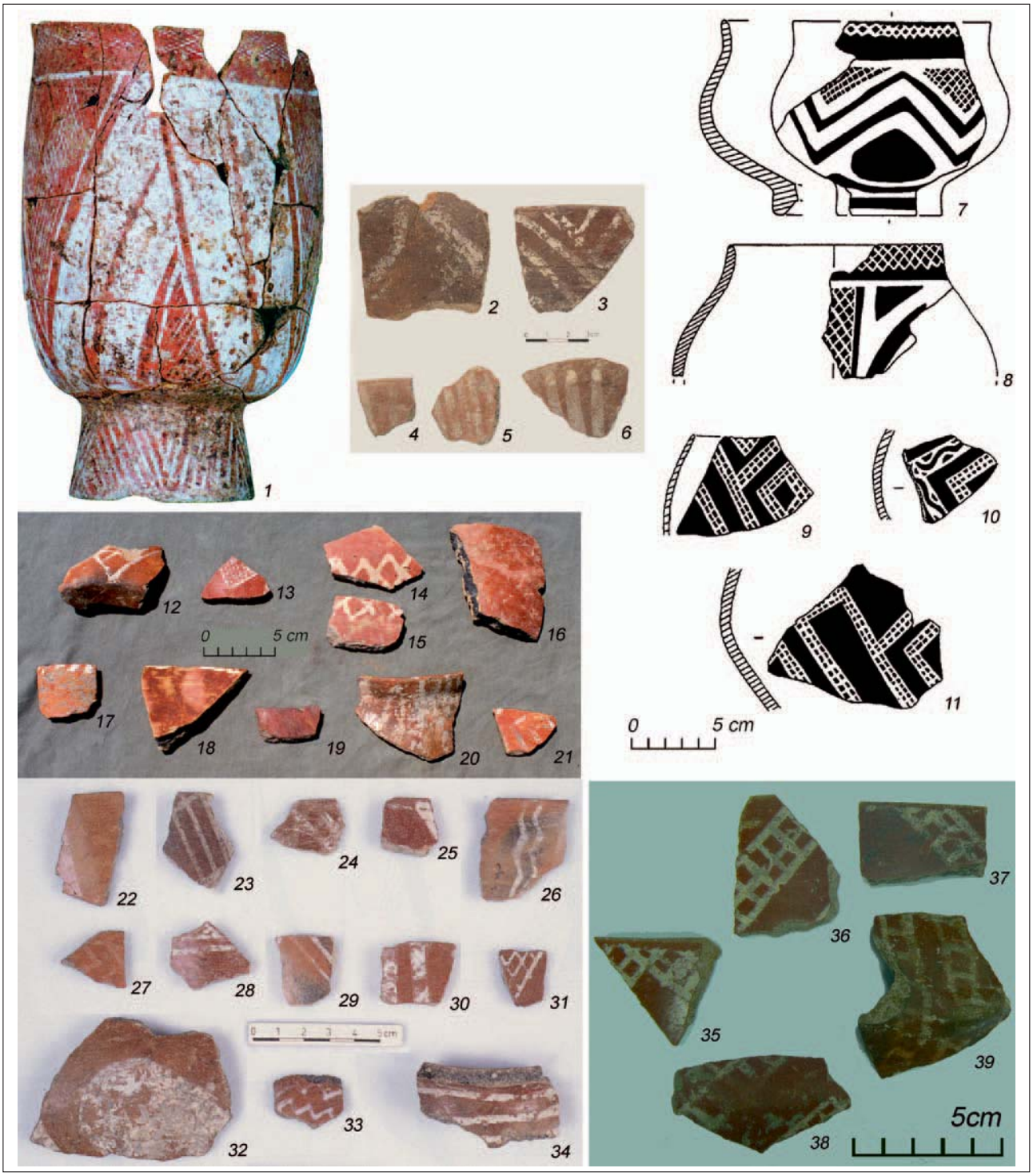

Fig. 5 Early Neolithic fragments of red slipped and white painted pottery from the Balkans. Stylistic group of grid and parallel lines decoration. 1 Karanovo I. 2–6 Aşağı Pınar. 7–11 Kovačevo Ib–d. 12–21 Koprivec. 22–34 Hoca Çeşme II. 35–39 Džuljunica 2. Differend scale. 1 after Hiller – Nikolov 1997, pl. A; 2–6 after M. Özdoğan 1999, fig. 40; 7–11 after Lichardus-Itten et al. 2002; 22–34 after M. Özdoğan 1999, fig. 39; 35–39 photo Nedko Elenski.

123 Lichardus-Itten et al. 2002.

the excavators in Kovačevo have always emphasized[124]. Four phases, Ia to Id, could be determined for the early Neolithic at this site. The painted pottery of these phases was divided into stylistic groups A to I, which are more or less indicative of certain stages of development[125]. The excavators compare Kovačevo Ic with Karanovo I[126]. But looking at the characteristic net- or grid-decoration of the stylistic groups A and B, preferably Kovačevo Id can be parallelized with Karanovo I (Fig. 5). From this it follows that the whole development from Ia to Ic must be older than Karanovo I. Radiocarbon ages place the horizon of Kovačevo Id/Karanovo I in the first quarter of the 6th millennium calBCL[127]. For this reason, one might expect that Hacılar I and Aşağı Pınar 6 are roughly contemporaneous. In this equation, it is indeed astonishing that we are dealing with 70% painted pottery in Hacılar I versus only 3% in Kovačevo! Even though no data are available for Aşağı Pınar 6 and Karanovo I, the amount of painted pottery in the entire spectrum appears to be similarly small.

Proper tulip-shaped beakers (›Tulpenbecher‹), as characteristic for the phases Karanovo I and II, do not appear in the Struma valley, which enables a clear typological delimitation from Thrace. White-on-red painting with grid patterns and spiral and linear motifs continue to be typical and now often cover the entire vessel surface. Due to the still dominant white painting, the synchronization of Kovačevo Id with Karanovo II, as proposed by Lichardus-Itten[128], must be rejected. In fact, a development within the Karanovo I horizon can be recognized. In Karanovo II, subsequently, painting is only seldom observed, and then in a dark color. Vessels with applied relief decoration are much more frequent, for instance with overlapping channels and incised lines and dots[129]. In view of the development in Macedonia, the entire development in painting techniques in Kovačevo seems to take place within the phases Anzabegovo-Vršnik Ic and II[130]. Thereby, Kovačevo Ia can be paralleled with Anzabegovo-Vršnik Ic, basing upon the predominating rows of drops and zigzag bands[131]. Then in Kovačevo Ib the net-pattern that is characteristic of Anzabegovo-Vršnik II appears. In addition, dark-on-light painting is present as well, differing only in that there is almost no mentionable decrease in the amount of white-painting within the entire spectrum of painted pottery in Kovačevo, including phase Id[132]. By contrast, the phase Anzabegovo-Vršnik III, distinguished by black painting and above all large spiral motifs, was not reached in Kovačevo.

Do Purely Monochrome Ceramic Complexes Exist at all?

This situation in early Neolithic pottery can be understood most clearly at Džuljunica-Smărdeš. The Neolithic settlement lies at the foot of a Copper Age tell, which was already excavated by P. Stanev in 1983–1984. Since 2001 Nedko Elenski has led ongoing excavations there that comprise several test trenches in the area of the early Neolithic settlement[133]. He has distinguished four stratigraphic phases, which now enables the oldest Neolithic pottery to be linked to the developed early Neolithic period. The lowest building phase, Džuljunica I, yielded pottery that can be synchronized with the oldest phase in Koprivec[134]. Sherds of simple rustic pottery are always tempered with coarse organic material and covered with a brown clay slip. A few of these vessels display painting in a darker brown colour (Fig. 2, 1–2. 5–6). Finer ware is typically extremely thin-walled and the temper is scarcely visible. It is also coated with a clay slip, but contrary to coarse pottery, the inner and outer surface is always highly polished. Technologically and typologically this pottery is the same as that found in trench B in Koprivec. However, it is noteworthy that in Džuljunica-Smardes the painting on some vessels is – as mentioned above – brown in colour, a technique that is not immediately noticeable and, thus, can be easily overlooked in a brief inspection of the ceramics. If the pottery of Džuljunica 1 and related sites does indeed mark the time of the Neolithisation in southeastern Europe, then painted pottery was present from the very beginning! The following overlying layers Džuljunica 2 and 3 exhibit a similar spectrum of forms, whereby the clay slip as well as thick-walled and thin-walled ceramics are often coloured red[135]. White paint was then applied against this background, a characteristic feature of the phase Karanovo I. The uppermost layer, Džuljunica 4, displays a somewhat different spectrum of ceramic types[136]. Characteristic there are vessels with a channelled surface, which can be correlated with the material from Ovčarovo-gorata or with phase Karanovo II in Thrace.

The Horizon of Karanovo II North of the Balkans

Karanovo II is a phase of the developed early Neolithic, as best represented in the material from the site of Ovčarovo-gorata, which is located north of the Balkan mountains. I had the opportunity to study the material excavated from 1974 to 1979 at that site[137]. The repertoire contains various forms of pots with globular shapes, with an S-profile and – very seldom – with biconical walls (Fig. 6, T1a – T3). There are various forms of bowls as well (Fig. 7, S1a – S4b). The massive foot, the high ring base and the elongated stand are characteristic features. Although not very numerous, the plump jug-like

124 last Lichardus-Itten et al. 2002, 118; Lichardus-Itten – Lichardus 2003, 63–65.
125 Lichardus-Itten et al. 2002, 119–122; fig. 6.
126 Lichardus-Itten et al. 2002, fig. 3.
127 Görsdorf – Bojadžiev 1996, 131 f; Bojadžiev 2007.
128 Lichardus-Itten et al. 2002, fig. 3.
129 Hiller – Georgiev 1997, pl. 18–25; Георгиева – Симеонов 2006, pl. 10–19.
130 according to Garašanin 1998.
131 Lichardus-Itten et al. 2002, pl. 17–18.
132 Lichardus-Itten et al. 2002, pl. 11–16.
133 Еленски 2006.
134 Еленски 2006, fig. 6–8.
135 Еленски 2006, fig. 9.
136 Еленски 2006, fig. 10.
137 Krauß 2007; Krauß forthcoming a.

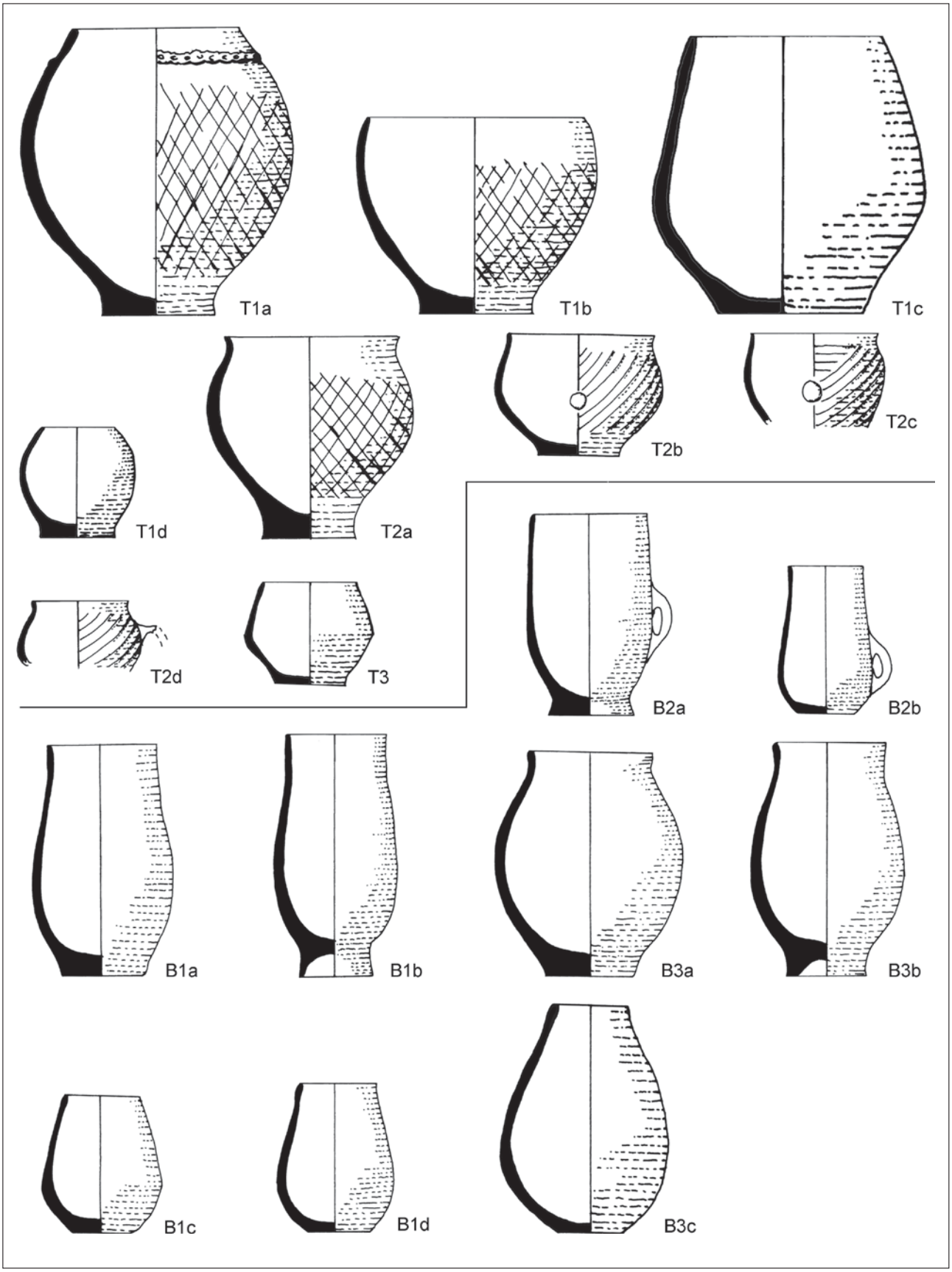

Fig. 6 Typology of the main ceramic forms from Ovčarovo-gorata. Pots and beakers.

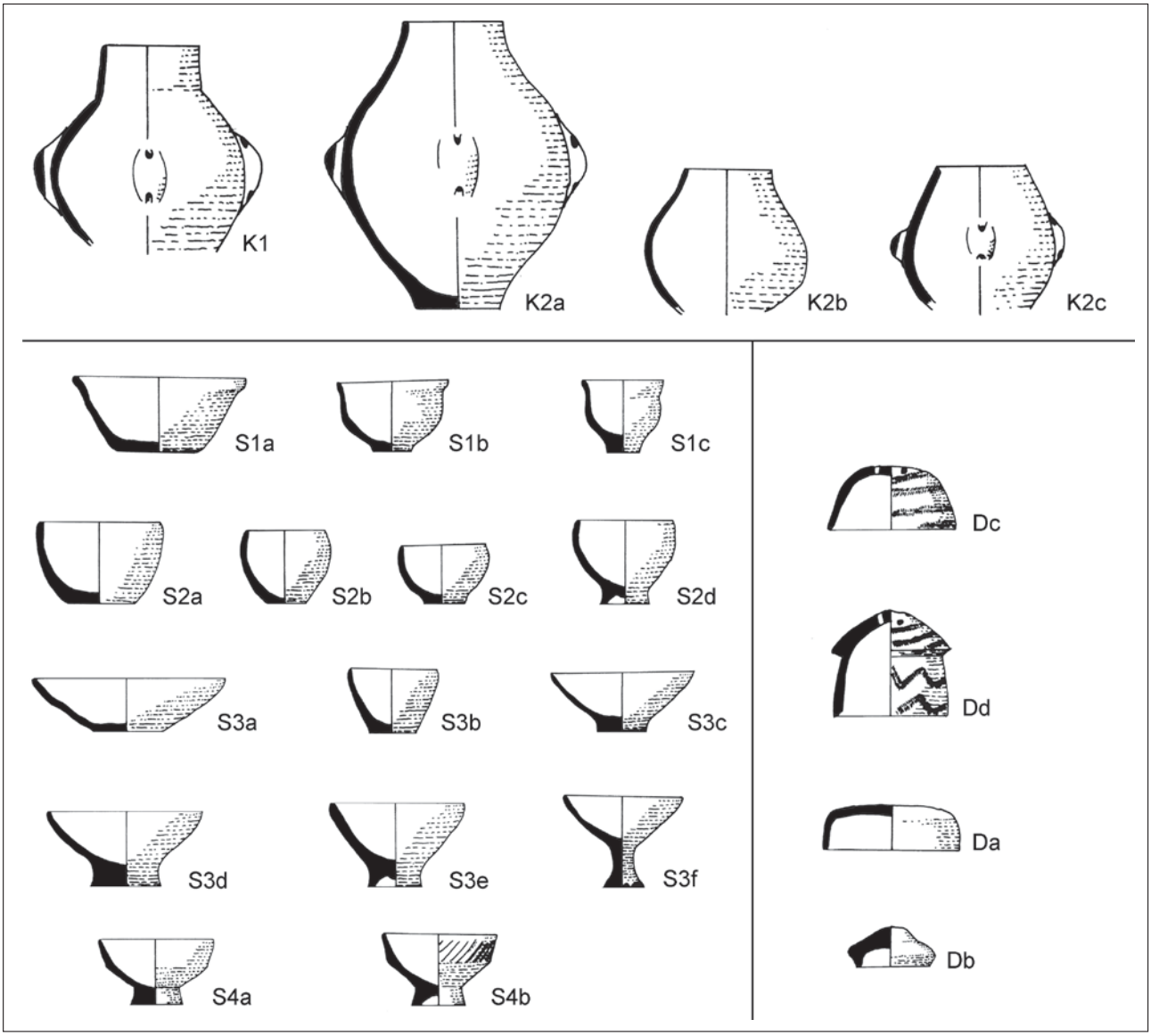

Fig. 7 Typology of the main ceramic forms from Ovčarovo-gorata. Jug-like vessels, bowls and lids.

vessels with a narrow, cylindrical or conical neck are nonetheless very typical of this phase (Fig. 7, K1–K2c). Furthermore, the lids shown here belong to these vessels (Fig. 7D). During the phase Karanovo II, painting is increasingly replaced by applied relief decoration on vessels. The few painted examples display a dark colour in simple linear patterns upon a light background. Fine channels on the surface, above all on beakers and finely made pots, are very typical of this time. Coarsely made vessels carry incised and impressed designs. In addition, there is an abundance of relief decoration, ranging from the simplest decoration with impressed or notched cordons to complex relief ornamentation. With this time horizon a stage is reached in which the Neolithisation encroaches into the north Pontic steppe zone[138]. Whether it is a Neolithic in the economic sense, or only in the technology of making pottery, while retaining the hunting- and fishing-based way of life, is another question.

Conclusion

There is no question that the Neolithisation of the Balkans was initiated from Anatolia. Around 6200 BC at the latest, an expansion of pottery-producing groups can be assumed (Fig. 8), which reached as far as the lower Danube and perhaps even into the flatlands of the southern Carpathian Basin. Somewhat older dates are available only for regions in Greece, which, however, do not appear before the middle of 7th millennium BC, but indeed rather in the second half of the

138 Wechler 2001; Krauß forthcoming b.

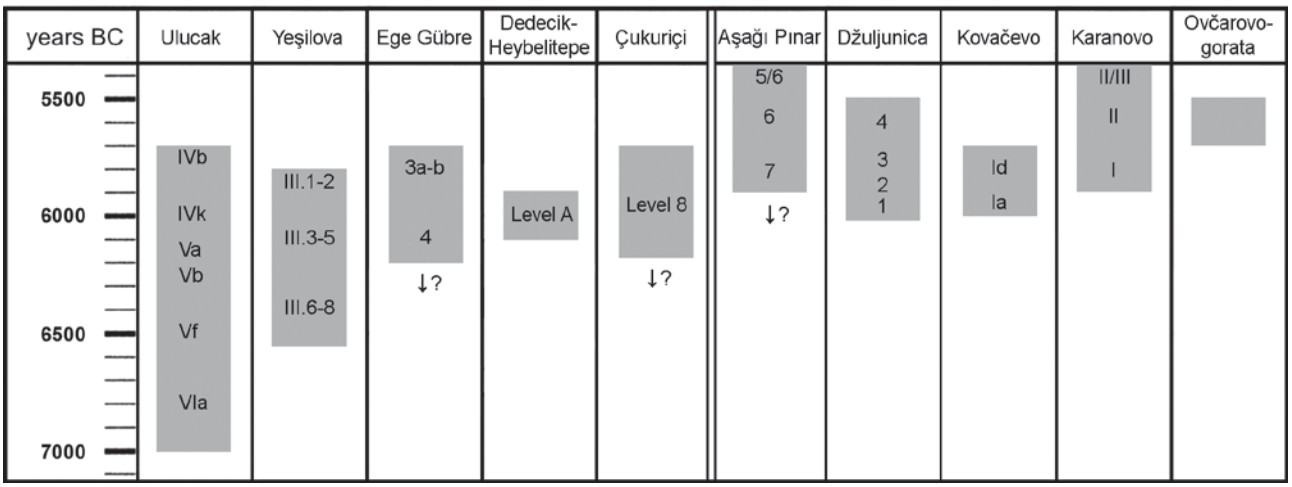

Fig. 8 Synopsis of the chronological development at selected sites in west Anatolia and the Balkans. Periodisation of the Anatolian sites according to Çilingiroğlu 2009, fig. 6. 7.

7th millennium[139]. Hence, pottery first arrived in southeastern Europe at a time when the phase of monochrome pottery in the southwestern Anatolian Lake District had already ended. The find horizons in the tell at Hacılar, where the proportion of painted pottery in the entire spectrum is over 50%, may be viewed as parallel in time with the early Neolithic in the Balkans. However, the amount of painted pottery in southeastern Europe during the whole early Neolithic is notably below 10%. Finds of painted fragments in contexts that may be seen as very early show that painted pottery was present from the very beginning in southeastern Europe. But initially the proportion of these fragments is minimal, for instance in the lowest deposits in Koprivec, Džuljunica and Kovačevo. Significantly, sites in western Anatolia and the Marmara region, which are geographically closer to the Balkans, do not display a tendency towards any outstanding vessel painting. In this respect, the situation of find contexts in southeastern Europe is not unusual. Indeed, the southeast Anatolian Lake District is conspicuous because of its vessel painting.

With the horizon of Ovčarovo-gorata and Karanovo II, between 5700 and 5500 BC, pottery painting is replaced almost completely by decorations applied in relief to the vessel surface. It is only during this time that evidence of strong connections between the areas of the Balkans and the North Pontic steppe can be observed. These areas probably adapted the technology of ceramic production at that time. For the first time, the strong relationship between the southeast European Neolithic and the cultural development in Anatolia seems to have lessened, a situation that is reflected at least in a far-reaching independent development in ceramics.

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139 Reingruber 2008, tab. 4. 1–28.

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Rethinking the ›Preceramic Period‹ in Greece 50 Years after its Definition

by Agathe Reingruber

Abstract

Half a century has passed since the definition of a supposed Preceramic Period in Greece. The assumption that at the beginning of the Neolithic period communities in Thessaly grew cereals and herded animals but did not use ceramic containers was presented by Vladimir Milojčić. In October 1956 he tested the lowest levels of the Argissa-Magoula in two small intersecting cuttings and ascribed them to sedentary groups prior to pottery-producing communities[1]. Only a few weeks later Demetrios Theocharis likewise excavated levels seemingly devoid of pottery in Sesklo[2]. Thus the course for the definition of a ›Preceramic Period‹ was set and Milojčić continued his work in Argissa in 1958 under this supposition[3].

To provide a better understanding of the beginning of the Neolithic Period large-scale excavations are needed[4]. Without them, the scant data available is open to a broad spectrum of opinions and interpretations. Now, reviews of the original documentation and the finds from Argissa, studies of the pottery from EN-sites in the different museums, storage rooms and collections and scrutiny of the primary literature are allowing a more precise picture of the beginning of the Neolithic to emerge[5], the period adequately labelled by Catherine Perlès as ›Initial Neolithic‹[6].

The re-evaluation of the Preceramic Period is thus based on the documentation system applied by Milojčić in Arigssa, which for that time was of high quality, and on the ongoing discussion about the beginning of the Neolithic in Greece. As a result, we must reject not only the Preceramic Period as defined by Milojčić and Theocharis, but the basis for the definition of the Early Neolithic Period in Greece also has to be reappraised.

The Zeitgeist of the 1950s: The ›Preceramic Rush‹

It is of no coincidence that the term ›Preceramic Period‹ was coined in Greece in the late 1950 s and was one of the major targets of prehistoric investigations for two decades, until the untimely deaths of Theocharis in 1977 and Milojčić in 1978. Milojčić was convinced that in Argissa he had discovered layers that were coeval with sites from the Near East which were devoid of pottery. For this reason he also labelled the lowest levels in Argissa ›preceramic‹ and not ›aceramic‹. Between these two notions is a small, but important difference: The term ›aceramic‹ includes the aspect of not producing pottery on a specific Neolithic site although elsewhere it was already in use: Hacılar was labelled by its excavator as aceramic, since in Çatal Höyük, first pottery products were already known. In Crete, Knossos was also described as aceramic, being initially interpreted by its excavator as a short-lived camp of an otherwise pottery-using group.

The notion ›preceramic‹ refers to communities that were already sedentary, but did not yet produce pottery – as was the case in the earliest stages of the Neolithic in the Near East. The term ›Pre-Pottery Neolithic‹ was coined by Kathleen Kenyon in 1957[7]. She took charge of the excavation in Jericho in 1952 and dated the meter-high layers without pottery to the 10th – 8th millennium BC. At the beginning of the same decade, Robert Braidwood excavated newly discovered sites in Iraqi-Kurdistan such as Jarmo[8].

Also in 1952, Milojčić discussed the possibility of a ›Preceramic Period‹ in central Europe. Pollen analyses from locations near the Alpine Lakes, areas that had not been settled by the Linear Pottery Culture, directed his attention towards the phenomenon of an early agriculture, supposedly contemporaneous with »certain Mesolithic cultures«[9]. The new discoveries from the Near East appeared to substantiate his assumption that such a phase existed in southeast Europe also.

The following year, 1953, Milojčić conducted preliminary surveys in eastern Thessaly. At Argissa-Magoula in 1956, he reached deposits seemingly without pottery at a depth of 8 m. Following that, Theocharis also detected such layers in Sesklo, Soufli, Gediki and Achilleion – layers which were not properly excavated, but only tested using very small trenches. At Knossos in Crete, John Evans found aceramic deposits under the Minoan Palace between 1957 and 1960. At the same time James Mellaart was excavating in Hacılar, where in the very last days of his final excavation season of 1960, he encountered deposits that he interpreted 12 years later as aceramic. The archaeozoologist Sebastian Payne, a member of the team of Thomas Jacobsen in Franchthi from 1967, de-

1 Milojčić 1956a; Milojčić 1956b.
2 Theocharis 1958.
3 Milojčić 1959a; Milojčić 1959b; Milojčić 1959c.
4 All so-called Preceramic sites in Greece were excavated in extremely limited trenches of less than 60 m² (Reingruber 2005, tab. 1), smaller than for example an Early Neolithic house in Nea Nikomedeia or in Karanovo I.
5 Reingruber 2008.
6 Perlès 2001.
7 Kenyon 1957.
8 Braidwood – Howe 1960.
9 Milojčić 1952, 316. A re-evaluation of these finds in Reingruber – Rösch 2005.

fined the »gray clay-stratum« from the cave in the Argolid as ›preceramic‹.

Looking at the excavation and publication data of all these sites, one has to admit to the narrow temporal limits of the activities between 1956 and 1967. More than that – most of the scholars met each other or were in close direct or indirect contact: Mellaart was entrusted in 1952 with the excavations of the graves in Jericho. The archaeobotanist Hans Helbaek was not only a member of the Braidwood team in Jarmo and the Mellaart team in Hacılar, but he also worked with Evans in Knossos. Milojčić met Braidwood for the first time in 1958 in Hamburg during the International Congress for Prehistory. This meeting resulted in a visit by Braidwood to Thessaly. In 1964, before working in Franchthi, Payne analyzed the animal bones from the aceramic site Aşıklı, in central Anatolia.

It is therefore no coincidence that a ›Preceramic Period‹ in Thessaly was defined only shortly after the definition of the PPN in the Near East. Nor does it appear to be a coincidence that since the Milojčić/Theocharis era no other supposedly preceramic sites have been found[10] – or they were found, then subsequently redefined[11].

Early Periodization

As early as 1960, Milojčić set out a timeline for Greece, which was widely accepted. The partition of the Early Neolithic into four phases (Fig. 1) relied mainly on ceramic varieties, among which the absence or occurrence of paint was the most important trait[12]. The absolute dating of each period was only an estimate. Milojčić was a harsh critic of the radiocarbon method and wrote several articles explaining his disapproval[13].

Periodization of Milojčić		Ceramic categories
Sesklo (MN)	(Sesklo)	Red on white
Vorseskl o	(Praeseskl o)	„Cardium"/Impresso
Protoseskl o	(Protoseskl o)	Early painted
Frühkeramikum	(Early Ceramic)	Monochrome
Präkeramikum	(Preceramic)	–

Fig. 1 Periodization proposed by Milojčić 1960.

It is well known that the early ^{14}C measurements were imprecise, showed big standard deviations, and caused a lot of misunderstandings. For example, the very high dates from analyses carried out in Los Angeles on animal bones from Argissa at the beginning of the 1970 s as well as those from Nea Nikomedeia from the 1960 s have led to dubious judgements. They seemed to confirm Milojčić's view that preceramic layers occurred in Greece at a time when pottery was not yet in use in the Near East. Thus it seemed quite logical that the earliest Neolithic settlements had to be from a ›Preceramic Period‹. After the introduction of the AMS-method the material was dated to several centuries later, not only in Nea Nikomedeia. A re-estimation of the ^{14}C data, passing the 7,000 BC[14] mark would itself lead to a reassessment of the ›Preceramic Period‹.

A New Appraisal of the Situation in Argissa

Argissa lies near the river Peneios, which cut into it to such an extent that one third of the Magoula has been washed away. Excavating close to this natural profile in 1956, Milojčić reached a layer that seemed to contain no pottery. Indeed, the sherds, as well as the finds in general, collected from here were few, but still, all the spits assigned to the Preceramic Period contained pottery. Milojčić did not ignore these finds, but first discussed and consequently threw them away, saying they were »intrusions from above«[15] and not of diagnostic type. His published statements concerning the number of sherds vary between no sherds and few sherds. In his opinion, all sherds were intrusive, since during construction activities or rainy periods they were dislocated from the layers above and therefore should »(…) from the very beginning be excluded from considerations in order to gain a safe picture.«[16]

In the original documentation of the Argissa-Magoula the occurrence of sherds is mentioned for each ›preceramic‹ feature[17]. The total amount is 120 (Fig. 2).

Milojčić's statements also vary when discussing the thickness of the deposits: At the end of the 1956 season Milojčić decided to use two intersecting narrow trenches (the ›Kreuzgraben‹), to check whether more cultural deposits were to be expected, since some parts of the surface were sterile. The depth of the crosswise sections was of approx. 30 cm, their lengths being 4 and 6 m respectively. They cut exactly the area where the next season several depressions were excavated (Fig. 3). According to the fashion of the time

10 E. Protonotariou-Deïlaki, a student of Theocharis, argued that in Lerna under the »House of the Tiles« an 85 cm thick layer devoid of pottery had been found, but the excavator, John Caskey, did not pay any attention to it (Πρωτονοταρίου-Δεϊλάκη 1992, 100. 103; footnotes 18. 34). Referring to this situation Caskey explained that the small-sized area of only 1.5 m length contrasted to all other parts of the site where ceramic fragments occurred in the lowest levels and thus this situation should not be overestimated (Caskey 1957, 153).

11 Initially in Hoca Çeşme its excavator M. Özdoğan described a phase V belonging to the ›Preceramic‹ (Özdoğan 1993, 186), but later it was dismissed.

12 Milojčić 1960, 328.

13 Milojčić 1961. Nevertheless, in 1958 he sent twelve samples from Argissa to the laboratory in Heidelberg, sparing no effort or expense. But still, his fatal misjudgement can hardly be comprehended nowadays.

14 Reingruber – Thissen 2005; Reingruber – Thissen 2009.

15 Milojčić 1962, 14.

16 Milojčić 1962, 14: »(…) von vornherein aus der Betrachtung auszuschalten, um ein möglich sicheres Bild zu gewinnen«.

17 The accuracy of the lists is owed to Harald Hauptmann who was entrusted in 1958 with their maintenance.

Feature	sherds
spit 31a	56
spit 31b	49
spits 31d – c	9
»pits« β and δ	6

Fig. 2 Lowest levels from the Argissa-Magoula assigned by Milojčić to the ›Preceramic Period‹ and number of sherds they contained.

they were interpreted as dwelling pits (›Wohngruben‹)[18]. Milojčić later revised this opinion and stated that they were pits of unknown function[19].

The excavator argued that the ›preceramic‹ layer had been up to 1.20 m thick[20]. Neither the published profile drawings nor the field notes confirm this statement. In the profile drawing from 1962, the lowest level was labeled no. 1 (Fig. 4)[21]. No specific numbers were given to the deposits above; they were subsumed into no. 2. No clear distinctions could be made between the deposits of the EN, MN or LN from where the Dimini pit (no. 3) must have been dug into.

According to the diaries kept at the University of Heidelberg, a reconstruction of a very theoretical profile is proposed in Fig. 5.

In 1956 Milojčić encountered sterile soil in some places at a depth of 8 m, especially near the south-eastern profile. In the central part of the small trench he identified scant remains of human activity, testing them by 50 cm broad sections. When returning to the site in 1958 he excavated them properly in 3 separate spits. He first cleaned the surface (spit 30) and then excavated in 10 cm thin spits (31a – c, 31d being the top of the sterile soil) to the depth of the crosswise sections. The ›preceramic‹ stratum is therefore only 30 cm deep.

Below spit 31d, the pits appeared at 8.30 m. They were thus 20–30 cm deep and formed an uneven surface as may

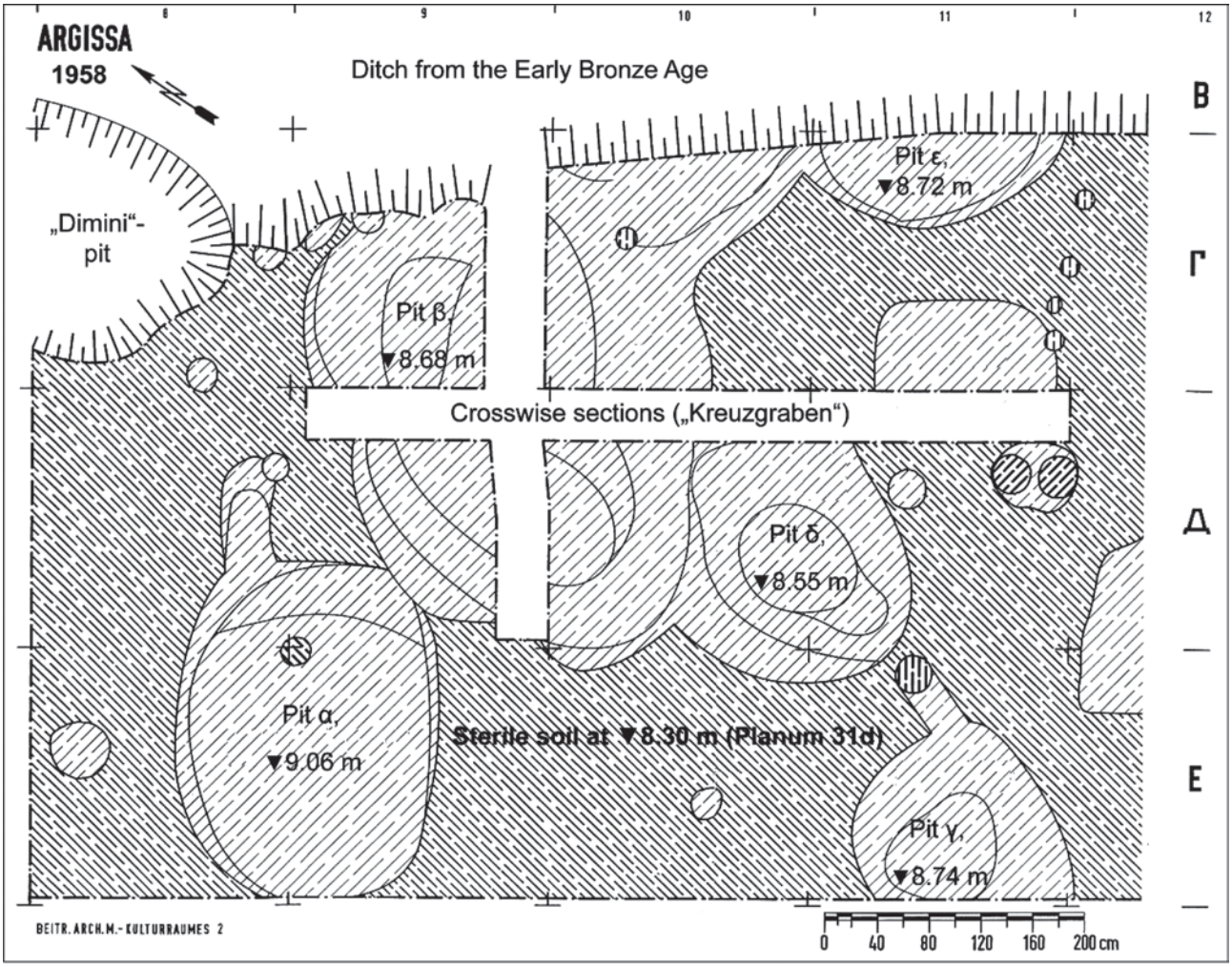

Fig. 3 Sketch of the »Preceramic level« in Argissa (after Milojčić 1962, pl. III).

18 Milojčić 1959b, 6; Milojčić 1960, 328.
19 Milojčić 1962, 12. 24.
20 Milojčić 1956a, 165; Milojčić 1956b, 209; Milojčić 1960, 323.
21 Milojčić 1962, pl. IIc. Misleadingly, the sterile soil is also represented with the identical signature. Unfortunately in the drawing of the northeast profile (Milojčić 1962, pl. IIb) the ›preceramic‹ level has also been added, although according to Milojčić the ditches from Early Thessalian times (Milojčić 1962, fig. 4, 4) cut into the Early Neolithic levels, destroying them completely near this profile (Milojčić 1962, pl. V).

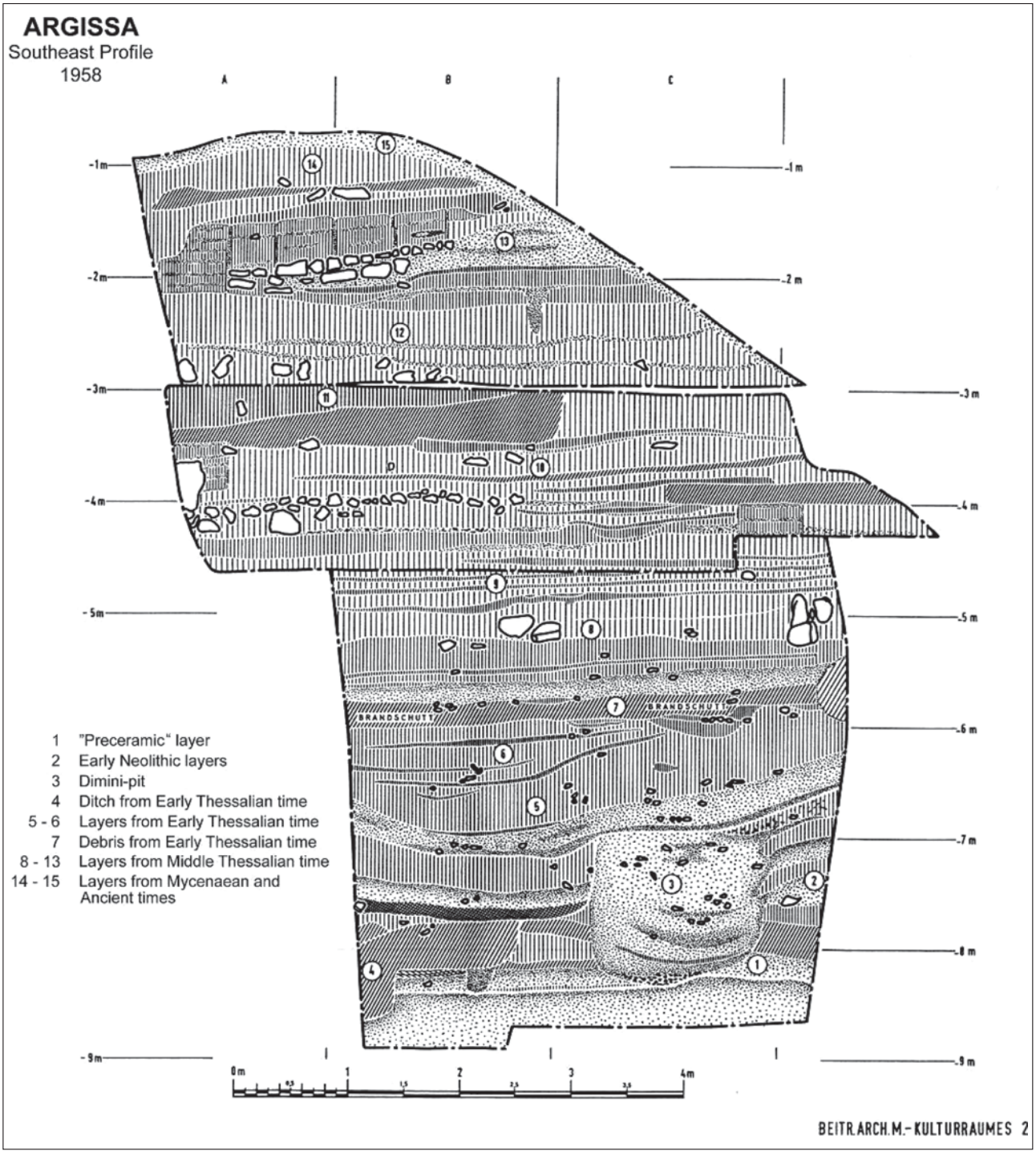

Fig. 4 Southeast profile of the Argissa-Magoula (after Milojčić 1962, pl. IIc).

have been encountered by the first settlers. An exception is Pit α, which had not only the shape of a pit (Fig. 3 and 5), but also walls lined with clay.

The pottery fragments from here have not been kept, but from the descriptions we know that they were identical to those from the ceramic layers above – which is why they were interpreted as being intrusive. The vessels were of simple shapes and neatly executed; they all are finely polished, have thin profiles and rounded lips. Common shapes are the plain, slightly closed or open cups with a low ring base. Their surfaces are mainly reddish or brownish. The successive levels contained a greater variety of surface colours and rim-shapes, the lips being slightly pronounced. Surface colourations range from red or reddish-brown to black or buff[22]; a combination of the last two shades results in the ›blacktopped‹ pottery. These variants were called by Milojčić ›buntpoliert‹. The variety of these colours seems to disappear at the transition to the MN with red-coloured surfaces now dominating again – but with different shapes, among them concave profiles.

22 Reingruber 2008, pl. 1–3; colour pl. 2, 1–2.

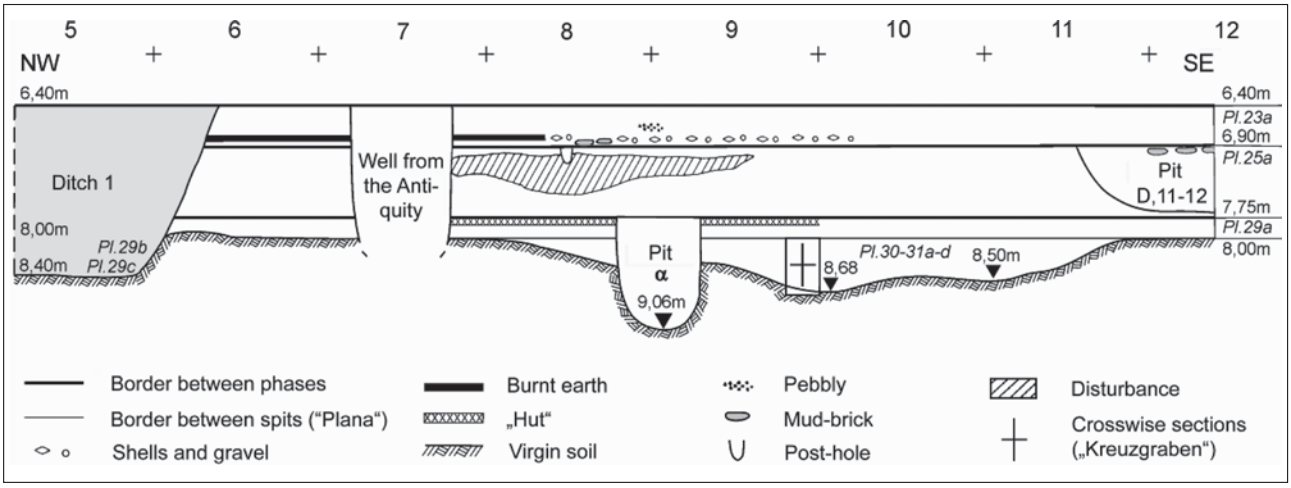

Fig. 5 Reconstruction of the sequence of Neolithic layers in Argissa-Magoula.

The ›Monochrome Horizon‹: a Stylistic and a Chronological Appraisal of Pottery Styles

Before discussing the pottery types of the Early Neolithic, we must first address the question – and the importance – of a potential ›Monochrome Horizon‹ for the very beginning of the Early Neolithic, the Early Neolithic I. The term ›monochrome‹ is among the worst defined ones. The most simplistic definition includes all types of surfaces which do not bear traces of paint. But to subsume surface treatments like nail impressions, incisions or complex plastic decorations into one group is to exclude distinctions of major chronological significance from the very beginning. The separation of a meaningful chronological horizon makes sense only if ›monochrome‹ is understood in a very strict sense, including surfaces of the same colour-shades, not bearing any other decoration techniques, not even a slip in a different hue. In Argissa this kind of pottery was indeed encountered in the lowest levels, the only additional feature being simple pellets or pierced knobs.

Not included in this strict and chronologically relevant definition are surfaces of vessels with different colour values (e.g. blacktopped vessels) as well as those with a reddish surface and an additional white slip. Also inexistent in the ›Monochrome Horizon‹ are surfaces with impressions, incisions, ripples or sophisticated plastic decorations, since they appear only in later periods.

In the whole of Greece a monochrome horizon is attested only in Thessaly and here it can convincingly be proven

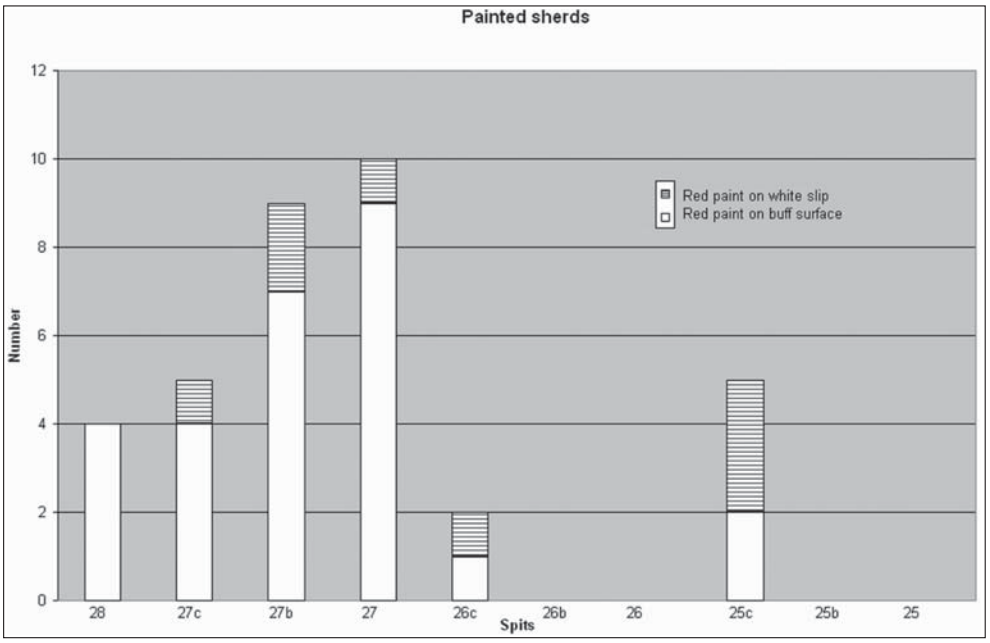

Fig. 6 Number of painted sherds from the EN-spits of the Argissa-Magoula.

in only three cases (Argissa, Sesklo and Gediki). Sherds with a monochrome appearance can nevertheless be found also in a later context belonging to the EN II or EN III. Even in the MN simple red polished surfaces were produced – hence greater importance should be paid to the shapes they derive from, especially the lips.

Three types of decorations are known from the Early Neolithic Period in Argissa: plastic decoration, painted decoration and impressed decoration. In the very beginning the surfaces were reddish or buff, sometimes showing blotches of red colour with no distinct patterns; later, during the EN II, clear patterns appeared in a red colour on mainly buff surfaces but also on a white slip. Black and blacktopped variants appeared simultaneously, indicative of more sophisticated burning techniques with or without oxygen[23].

Milojčić pointed to an interruption in the use of red paint before the Impresso pottery appeared in spit 24. He correlated this situation with the arrival of new people. But given the low number of painted sherds per spit and especially the fact that there were interruptions before in spit 26, not finding painted sherds might have been a pure coincidence (Fig. 6). Besides, the tradition seems to be unbroken during the Middle Neolithic when red on white paint was still used, sometimes also in combination with Impresso.

^{14}C Dates

Regarding the ^{14}C dates, the two very high dates and the one very low datum processed on animal bones at the UCLA are clear outliers. The charcoal samples form a stratigraphical sustained sequence. Even the very late date from Heidelberg supports the re-evaluation of the sequence since it turned out to derive from a wooden post that belonged to a construction from a higher level. When modelled with OxCal the series starts around 6500/6400 BC (Fig. 7)[24].

Short Appraisal of Sites Coeval to Argissa-Magoula

Closely linked with Milojčić and his results in Argissa is the interpretation of the situation in Sesklo. Here Theocharis initiated a new series of excavation seasons in three different areas: on the acropolis (A), to its southwest (B) and to its west (C). During the heavy earthquake of 1955 the northern part of Sesklo A collapsed, requiring clearing and rescue excavations. These were started by Theocharis in the winter of 1956[25]. Due to the influence of Milojčić, deposits devoid of pottery were detected here too. But when visiting the site in 1958, Harald Hauptmann was able to identify small sherds in the lowest level[26]. No exhaustive publication of these important levels has been provided, the plans presented by two different authors being contradictory[27].

Early Neolithic deposits also occurred to the west of Sesklo A, where Theocharis worked together with Mies Wijnen in the area labelled Sesklo C. Here the situation is even more confusing; although the trench is rather small, it has been excavated in three parts, first in the western, then in the eastern and finally in the middle portion. As can be seen in the profile drawing, the sterile soil has not been reached everywhere, especially not in the central part[28]. The supposedly preceramic deposits are confined to the eastern corner, and they seem to coincide with a shallow pit located here. The pottery from the above deposits was published briefly by Wijnen[29]. Typical are – as in Argissa – the plain, open small bowls and cups with mainly ring bases.

The ^{14}C dates are similar to the ones from Argissa. They also show that a beginning of the Early Neolithic in Thessaly around 7000 BC is not conceivable, as the sequence starts at 6500 BC[30].

In Achilleion, Gediki and Soufli-Magoula Theocharis claimed to have reached ›preceramic‹ (or protoneolithic, as he called this period) levels[31], although in only small trenches. Excavations conducted by Marija Gimbutas in Achilleion and Kostas Gallis in Soufli revealed no preceramic levels when they returned to these sites only few years later[32]. When modelling the ^{14}C data from Achilleion[33], they suggest a beginning of the site at around 6200 BC, which is in agreement with the pottery, since from the very beginning painted vessels were produced. For Achilleion, not only a preceramic but also a monochrome horizon must be dismissed.

In the Argolid, at the cave site of Franchthi, stratum X2 (or the »gray-clay-stratum«) has been assigned to the preceramic, since it contained the bones of domesticated animals next to those of wild animals. Most of the deposits in the cave were heavily disturbed. Only trench FA (split into FA-North and FA-South) measuring approx. 6 m^2 was the least mixed up. The western profile shows the succession of layers with the position of the »gray-clay-stratum«[34]. But this small trench was not at all free of disturbances, only a few units being not mixed[35].

No synopsis has been yet undertaken by the Franchthi team. Fig. 8 connects the single phasings according to the published information, combined with the ^{14}C dates. The lithic finds have been analyzed by C. Perlès[36]. In her opinion, the artefacts from the »gray-clay-stratum« showed technological

23 Reingruber 2008, colour pl. 2, 4–5. 3.
24 Reingruber – Thissen 2009, 751–770.
25 Theocharis 1958, 70–86.
26 Personal communication 2001.
27 Theocharis 1973, fig. 197; Wijnen 1992, fig. 6.
28 Wijnen 1981, fig. 13.
29 Wijnen 1981, fig. 11. To visualize the main shapes, drawings from Achilleion were used (Wijnen 1981, fig. 11, 8. 11. 14 identical with Θεοχάρης 1967, pl. XVIII A. XVII B. XIX D).
30 Reingruber – Thissen 2009, fig. 3.
31 Θεοχάρης 1967; Θεοχάρης 1981, 36–44; Theocharis 1973, 35 f.
32 Gimbutas et al. 1989; Γαλλής 1982. No reappraisal of the results of the small sondage in Gediki was possible.
33 Reingruber – Thissen 2009, fig. 4.
34 Jacobsen – Farrand 1987, pl. 7.
35 Reingruber 2008, 99–113; fig. 1, 1.
36 Perlès 1990.

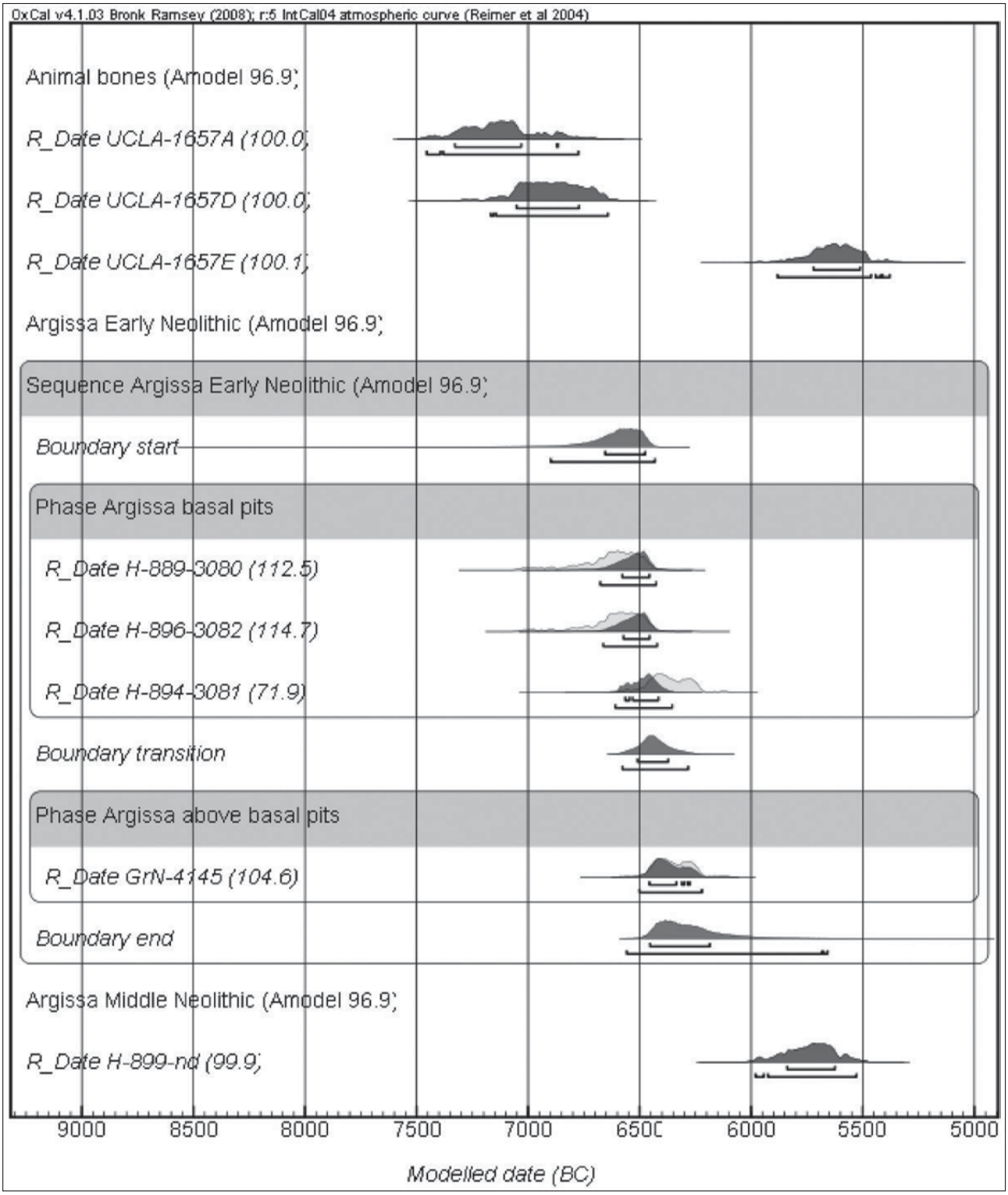

Fig. 7 Modelled ^{14}C-data from Argissa-Magoula (Reingruber – Thissen 2009, fig. 2).

features from both the Mesolithic and the Neolithic and were therefore put into the supposed Preceramic Period. Since there were not enough artefacts available for an evaluation from trenches FA-N/S, she included objects from the even worse contaminated areas. Thus, transversal arrow-heads, typical for the Mesolithic, and regular long blades produced using the pressure technique during the Neolithic appear to be coeval during the allerged Preceramic.

The archaeobotanist Julie Hansen[37] had to acknowledge a dramatic reduction of botanical finds during the zones V and VI at a time when the first peasants would have been expected to consume grains and wheat in large quantities. The lack

37 Hansen 1991, fig. 61–62.

Period	Data: calBC 1σ	Fauna: Payne 1975	Lithics: Perlès 1990	Flora: Hansen 1991	Pottery: Vitelli 1993
Middle Neolithic	5700 – 5500	E2-3	n. d.	VIIb	FCP 2
›Early Neolithic‹	6000/5800	E2	n. d.	VIIa	FCP 1
?	6500 – 6000				
›Preceramic‹/	7000 – 6500	E1	X	VI	FCP 0/1
Final Mesolithic	7000 – 6700	D2	IX	V	
Late Mesolithic	8200 – 7500		VIII	IV	
Early Mesolithic	8600 – 8200	D1	VII	III	

Fig. 8 Sequence of phases, zones and strata as worked out for Franchthi-cave by the different authors, combined with the results of the modelled 14C-dates.

of finds is not easily explained by poor preservation – during the Mesolithic, in zones III and IV, but also later in the Neolithic, in zone VII, charred finds were abundant.

As for the pottery, Karen Vitelli separated an early pottery Interphase 0/1 from the subsequent Franchthi-Ceramic-Phase 1 or FCP 1[38]. Nineteen sherds derived from the »gray-clay-stratum« and were first dismissed as intrusions[39]. But Vitelli pointed out that the sherds might indeed belong to the Mesolithic. During FCP1, shapes and decorative patterns appeared that are typical for the early MN in Thessaly, such as chevrons and high-necked vessels.

The picture the finds from Franchthi suggest is that of a rich Mesolithic inventory and, centuries later, of a rich MN inventory. In the interim, the cave seems not to have been used often. In this respect the ^{14}C data are quite expressive. There are two good sequences: one from the Mesolithic between 7000–6500 BC and another one from the Neolithic around 6000–5500 BC. In between are scattered three dates exclusive of each other, but overlapping with both periods, the Mesolithic and the Neolithic[40]. A ›Preceramic Period‹ has thus to be rejected for Franchthi cave also. The beginning of a Neolithic Period around 7000 BC that appeared due to influences from Thessaly cannot be proven. In this view the Early Neolithic in Franchthi starts at the end of the 7th millennium, at a time when in Thessaly the transition to the MN can be dated.

Knossos was excavated by Evans in a first round between 1957 and 1960. In the Central Court of the Minoan Palace, sterile soil was reached only in trenches AC. Knossos X is a thin layer of approx. 20 cm. It contained no pottery and was interpreted by Evans as the remains of a short-lived camp. According to the excavator, people settling here already knew how to produce pottery but started with its manufacture only in the following phase IX[41].

In a second round of excavations ten years later (1969–70) Evans opened 17 small soundings around the Central Court and the Palace and suggested a completely new interpretation of the site, since in two tiny trenches to the south of the Central Court he found layers containing mud-brick architecture, but (almost) no pottery. For this reason he re-interpreted Knossos X as the first settlement of a successful group of preceramic people occupying the site around 7000 BC[42].

Evans himself pointed to the strong similarities between the mud brick architecture from the two small soundings and those from level IX – VIII in the central part[43], but decided they were not contemporaneous. His main argument for connecting them to the aceramic level was the lack of pottery in the soundings. Yet this argument is ambiguous since he mentioned sherds found both during the excavation and in the water-sieve. Still he was rather »inclined to believe that they should be discounted«[44]. Also, the presence of two clay figurines not at all characteristic for the Aceramic Period raises further doubts against his connecting these deposits with Knossos X[45].

In a sounding north-east of Evans' trenches in the Central Court, Niklaos Efstratiou reached in 1997 the lowest strata of the site in an approx. 2 m^2 small test pit. The lowest level at 8.50 m depth was only 15 cm thick and contained no pottery. Charred grains of wild *Quercus evergreen* were dated to the first half of the 7th millennium BC. In Efstratiou's view this result confirms Evans' high date of 7000 BC for the start of the Aceramic Period, and it would also correlate well with the PPN B in Cyprus[46].

The ^{14}C data are ambiguous[47]. The modelled dates suggest on the one hand that Aceramic Knossos occurred anywhere between 7000–6700 BC[48]. Alternatively, the single reliable date, derived from domesticated grains (BM-436[49]), suggests a much later age for Knossos X at 6600 BC.

No matter how we interpret the radiocarbon data, they seem to be among the oldest ones in the Aegean. In my opinion, Evans' first interpretation of Knossos X as the thin

38 Vitelli 1993.
39 Interestingly, other finds such as animal bones or even smaller objects like stone tools or charcoal pieces, even single grains, are never considered to be intrusive. It is always only the pottery.
40 For more details see Reingruber – Thissen 2009, 756–759; fig. 6.
41 Evans 1964.
42 Evans 1971, 102 f.
43 On the only published plan from Aceramic Knossos (Evans 1964, fig. 7) remains from level X are shown together with those from level IX, suggesting a direct continuity. Level X has a threshing area and some pits. The walls made of mud brick are from level IX.
44 Evans 1971, 102 footnote 2.
45 Evans 1971, 102.
46 Efstratiou et al. 2004.
47 According to Winder (1991, 40) the samples were initially considered to be too small, but nevertheless the datings were carried out. Winder dismisses these dates, since only new samples could resolve the doubts thrown on their high age.
48 For more details see Reingruber – Thissen 2009, 758–761.
49 Although found in layer X and initially assigned to it (Warren et al. 1968, 269. 272), Evans later reassigned the date in a very arbitrary way to Knossos IX, since it seemed to him too recent (Evans 1994, 5).

remains of a temporary camp is more convincing than his revised interpretation. Although it is difficult to state where people came from, they may be linked with the southwest Anatolian coastal sites of Beldibi or Belbaşı[50]. Unfortunately we have no information about the subsistence economy of groups living near today's Antalya and there is no way to compare the finds with those from Knossos. But the more sites from the west coast that are going to be excavated according to modern standards (e. g. Ulucak and Çukuriçi-Höyük in this volume), the better the picture we will get.

Cultural Implications

Since the investigations of Christos Tsountas 100 years ago, Thessaly has become famous for the numerous and long-lived tell sites easily visible on the plain. Here the first evidence of sedentary communities throughout Europe has been uncovered, its social and economic implications preoccupying the scientific community intensively. The attractive finds, especially figurines, stamps, and adornments, also sparked the interest of a broader public, leading to the founding of private collections, which, eventually, were transferred to museums together with the knowledge of their find situation whenever possible. Thanks to the collaboration of land owners and people interested in prehistory many find locations were reported to the Ephorate in Larisa[51]. This multitude of information sources (excavations, surveys and chance finds) resulted in an atlas of prehistoric sites in Thessaly[52] that was subsequently used as the basis for discussions on Neolithisation processes[53]. The stark contrast between the absence of sites in the Mesolithic and the multitude of sites in the Early Neolithic favoured the idea of a colonisation of Thessaly by surplus populations leaving Anatolia.

But when going into detail, one must recognise that not all sites said to be from the Early Neolithic are truly from that period. Only few settlements were excavated, some of them re-excavated with new teams, none exposing the EN-levels over an area big enough to gain a clear picture. Most of the find spots are known only from surface finds or chance finds. If there were no painted sherds among the finds, they were easily dated to the EN I, the ›Monochrome Horizon‹. It is close to a disillusionment to finally realize that only three sites in Thessaly can indeed be claimed for the Early Neolithic I (Argissa, Sesklo and Gediki)[54]. Most of the others might belong to the Early Neolithic II or even later periods.

Also, the assignment of sites from other parts of Greece to the EN[55] is not based on a clear definition of pottery styles but is rather the result of an uncritical acceptance of previous allocations to this period or even of the use of an outdated chronological periodization[56]. As shown by ^{14}C dates and material groups (especially pottery) sites in Attica and the Argolid did not appear before 6100/6000 BC, being coeval with the beginning of the MN in Thessaly[57].

Groups of mobile hunter-gatherers have become more and more visible in the archaeological record throughout the Aegean over the past 20 years, especially in the coastal zones, but also inland[58]. Such sites are very difficult to trace – unlike Neolithic settlements, particularly tells. The contribution of the hunter-gatherers from Mesolithic times to the Neolithic way of life should not be underestimated. The mobile Mesolithic seafarers can be imagined in a constant exchange process between the coasts of the Aegean, adopting new products and commodities (among them new kinds of foods and beverages) and adapting to new ideas and patterns of behaviour. Certainly, these spectacular changes did not take place in 1–2 generations, but must be envisaged as a longer-lasting process. The first generations of adapting hunter-gatherers are not to be found in the lowest strata of tell sites but rather near the sea, in coastal areas perhaps submerged today. When moving to the plains of Thessaly, the next generations still cherished the exchange networks – in Argissa, figurines appear only in the EN II, in the whole of Greece no stamp-seal can securely be dated before the EN III/MN I and only after 6000 BC did new cereals like *Triticum aestivum* appear. It was not before 6000 cal BC that the Neolithisation process in what is now Greece had been completed, a process that started in Knossos around or even before 6600 cal BC and in Thessaly around 6500/6400 cal BC. When finding evidence of these very first generations of peasants probably still mobile to a certain extent we will, perhaps, have to discuss the question of ›Preceramic‹ communities anew. Nevertheless, in the Plain of Thessaly people settled with a broad spectrum of items to which ceramic containers already belonged.

Conclusion

Contrary to the expectations of Milojčić and Theocharis in the 1960s, a ›Preceramic Period‹ cannot be validated with any certainty at any of the sites. As yet, we have scant data for the centuries between 6700 and 6400 cal BC – a sedentary way of life at the transition from the Mesolithic to the Neolithic with the oldest generations of peasants not using pottery is conceivable, but cannot be proven for the time being.

50 Reingruber 2008, 66–70.
51 For his kind support during my stays in Larisa as well as for friendly and fruitful discussions I am indebted to Georgios Toufexis.
52 Γαλλής 1992.
53 e. g. Perlès 2001, 122 fig. 6, 4; 7, 3.
54 Reingruber 2008, pl. 2.
55 Papathanassopoulos 1996, fig. 9. 60.
56 For example in the 1975 posthumously-published article of the excavations carried out in the 1920 s in Nemea by C. Blegen the term EN is used the way it was applied before WW II. Yet the finds are compared to those from the MN in Chaironeia (Blegen 1975). Also, the assigning of sites from Crete to the EN when they in fact belong to the LN in mainland periodization is misleading.
57 Reingruber 2008, tab. 7, 3.
58 Reingruber 2008, pl. 1.

The Early Neolithic starts in Thessaly with a ceramic phase around 6500/6400 BC and lasts until 6000 BC; the 7000 BC threshold for a beginning of the sedentary way of life must be challenged. Not only must a ›Preceramic Period‹ in the way Milojčić and Theocharis constructed it for Thessaly be rejected. A ›Monochrome Horizon‹ also needs to be better defined[59]. From the very beginning ceramic vessels of high quality were produced; red surfaces were preferred, some of them showing colourful blotches. In the Greek landscapes, Neolithic sites appear at different stages: sites in the northern Aegean and the Argolid are up to 200 years later than those in Thessaly.

The western Aegean Neolithic cannot be explained without the involvement of the Eastern Aegean, but a colonisation wave from Anatolia into Greece is, according to the view presented here, not conceivable. The data rather indicate a constant exchange between the coasts, the western part not being always the recipient, but, as in the case of obsidian from Melos, to be the donor[60].

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59 On the problem of the monochrome pottery compare also Krauß, this volume.

60 Thissen 2000, 149; Lichter 2005, 59–74; Herling et al. 2008, 54 f.

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Latest Archaeological Research Regarding the Neolithic Period in the Republic of Macedonia

by Elena Kanzurova – Dragiša Zdravkovski

This is a brief observation of some of the results of archaeological research into the Neolithic in the Republic of Macedonia from 1990 till today. It aims to present the most impressive discoveries and to underline their importance in terms of prehistory in the Republic of Macedonia. However, a major handicap to this is the fact that most of these results have never been published. Thus, in our observations, we draw upon our research performed in Tumba Mađari in the last several years. Nevertheless, basing our statements on our own observation of the material, and on partial research in Pelagonia, Cerje, Govrlevo, Kumanovo and other places, we can establish the following:

1) According to our analyses, the process of Neolithization in what is now the Republic of Macedonia moved from Thessaly, northern Greece and Pelagonia towards the Skopje valley and Polog. Then it moved north toward Pannonia and east down the middle Struma River valley. This direction is reflected in the eponymous sites of Anzabegovo and Vršnik, Mamutčevo on the western verge of Ovče Pole, then Anzabegovo and further to Grnčarica and Vršnik down the Bregalnica River valley. The most southern sites of the Anzabegovo Vršnik cultural group is Damjan, which has a horizontal stratigraphy dating back to the Early, Middle and Late Neolithic; and Angelci near Strumica, from the Late Neolithic. Tumba Palčište is located in the west, below Šar Mountain, whereas Tumba Stenče is situated above the left bank of the Vardar River. This is in brief the territory on which the Anzabegovo-Vršnik cultural group developed during the Middle Neolithic period. The most significant progress of this group was in the Middle Neolithic; in the Late Neolithic, the territory remains the same, but only some of the sites feature Late Neolithic cultural strata. Out of all the sites explored so far, the biggest stratum was found in the site known as Stranata, located in the village of Angelci, southeast Macedonia (Fig. 1).
2) The process of Neolithization in the Skopje valley moved from Pelagonia (Pešterica near Prilep), the oldest settlement in the Treska River valley being Govrlevo. The oldest stratum features fine red (wine sediment color) pot-

Fig. 1 Some of the neolithic sites in the Republic of Macedonia.
(1 – Tumba Mađari, 2 – Govrlevo, 3 – Zelenikovo, 4 – Mršević, 5 – Stenče, 6 – Dolno Palčište, 7 – Čaška, 8 – Izvor, 9 – Rakle, 10 – Pešterica, 11 – Vrbjani, 12 – Mogila, 13 – Porodin, 14 – Velušina, 15 – Karamani, 16 – Trn, 17 – Ustie, 18 – Mamutčevo, 19 – Krupište, 20 – Barutnica Anzabegovo, 21 – Vršnik, 22 – Damjan, 23 – Angelci, 24 – Crničani).

tery with white painted triangles and angles similar to the ones found on plates from Veluška Tumba in Pelagonia.

3) Altar houses from the Velušina-Porodin group (Vrbjanska Čuka, Čuka Tpopolčani) with simple cylinders have also been found in Tumba Stenče, dating back to the Early Neolithic. Also, some other types of altars from Pelagonia have been discovered in other settlements of the Anzabegovo-Vršnik cultural group. The altars of the Great Mother cult discovered on the territory of the Anzabegovo-Vršnik cultural group originated in Pelagonia, where the predominant role is given to the house, with man represented only schematically, as a mask. Altar images of the Great Mother show her with various hairstyles and eyes, or pregnant (Govrlevo) (Fig. 2). Worthy of note, however, is an impressive male torso discovered in Govrlevo. The date established in a C14 laboratory (Kiel, Germany), is 5500 BC.
4) During the VI – V millennium BC, the Anzabegovo-Vršnik cultural group existed on this territory, using its natural resources and the creative energy of the group leaders. In terms of material culture, especially pottery production, the main features are stylized floral ornaments, presented best in Tumba Mađari.

Fig. 2 Altar from the Great Mother cult, Govrlevo.

Tumba Mađari, Skopje

Chronological and Cultural Determination

The first archaeological excavations of the Tumba Mađari site – Skopje, were conducted in 1978 by the Museum of Macedonia[1]. Research conducted so far confirms that this is a settlement from the Middle Neolithic, with three stages of existence. The site is part of the Anzabegovo-Vršnik cultural group, which belongs to the Balkan-Anatolian cultural complex. The oldest stratum discovered so far is chronologically compatible with Anzabegovo-Vršnik II; the second/middle stratum corresponds to Anzabegovo-Vršnik III, and the third/last one is from Anzabegovo-Vršnik IV, i.e. Zelenikovo II. The major economic and cultural flourishing of this group is in the Middle Neolithic period (5800–5200 BC), i.e. Anzabegovo-Vršnik II – IV cultural group. The excavations also proved the existence of fragments of white painted pottery which may indicate it began at the end of the early Neolithic.

Construction

In the period between 1981 and 2000, a total of eight houses with different inventories of movable and immovable objects were discovered[2]. Of those, seven chronologically belong to the third cultural stratum, whereas the house discovered in 1988 belongs to the second cultural stratum (Fig. 3).

The houses were built from wood, reeds, and hay and coated in mud and straw according to Neolithic architectural traditions. They are massive, solid and spacious. They usually have square or rectangular foundation whose area varies from 16 to 80 m^2, and are oriented according to the points of the compass, with small deviations. The roof has two slopes and consists of a wooden frame and a layer of wood and straw. This building tradition persisted until the mid-20th century when the nearby village of Taor was destroyed.

Neolithic builders paid significant attention to the appearance of external walls, but also to the internal supporting walls. Fragments of mud and straw coating were also discovered, decorated with incised handmade lines and plastic ornaments – mostly triangles and spirals. These are the favorite motives also found decorating pottery vessels.

The internal organization of houses was individual, according to the inhabitants' personal wishes and needs, not following a general rule. Almost all buildings discovered include fireplaces and furnaces. Part of the immovable inventory are items made of mud and straw in the shape of an irregular triangle or square, whose working title is ›tubs‹. They may be model ovens. These types of objects were discovered at the sites in Zelenikovo, Stenče, Mramori – all belonging to the Anzabegovo-Vršnik cultural group.

The results from excavations conducted in 1981–1982 from house 1, which the researcher defined as a sanctuary, are also known[3].

It has a square ground plan of 8×8 meters. The interior of the house is divided with a thin supporting wall that actually divides two ovens constructed next to it. A wheat mill set upon a small cylindrical pedestal made of earth was discovered in the central eastern part of the house.

1 Research in the period between 1978 and 2000 was managed by Vojislav Sanev, archaeologist at the Museum of Macedonia.

2 Information on the results from Tumba Mađari archaeological excavations was obtained from the reports by Vojislav Sanev (Sanev 1988).

3 Sanev 1988.

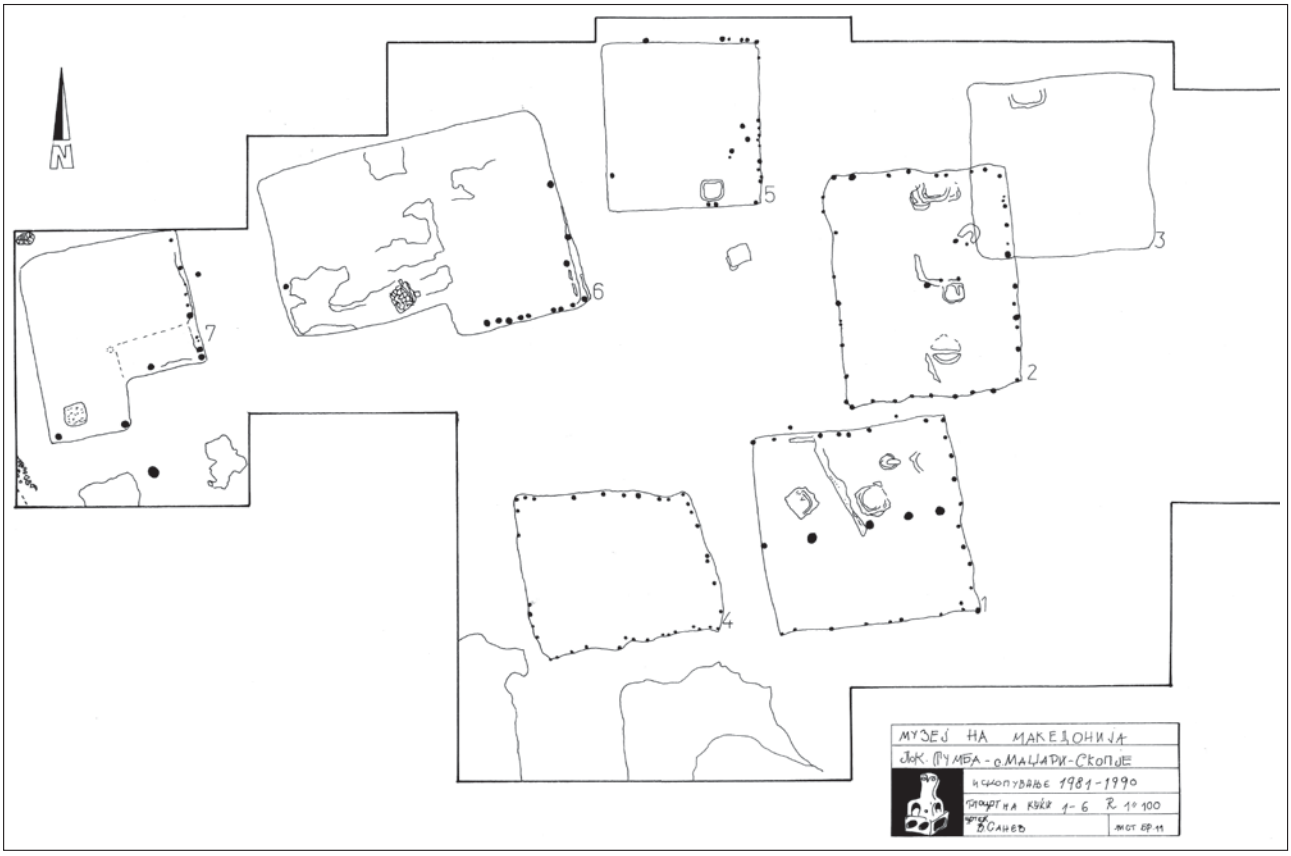

Fig. 3 Basis of the houses discovered between 1981–1990 at site Tumba Mađari.

Among the items discovered in the house were a total of 45 whole vessels and many fragments of pottery. These were amphorae, cups with a small cone-like leg, fruit-stands and a small pyxis. Various cups, pithoi with barbotine ornaments, plates and small vessels were found next to the walls. A major specificity of the Neolithic period in the Upper Vardar region and Tumba Mađari site were the askoi – water vessels. These were first discovered in Tumba, and moreover, in their classic form. Compared to askoi from other sites, these are the most beautiful both in terms of shape and manufacture (Fig. 4).

Especially noticeable are the fragments of cups and amphorae painted with dark brown color on a red/ochre background, with stylized floral ornaments – motives which further enrich the artistic repertoire of the pottery from Tumba Mađari discovered so far (Fig. 5a, b).

However, what makes this house, and Tumba Mađari, famous, is the ceramic representation of the Great Mother. Its impressive dimensions of 39 cm in height, its calm air of belonging to the house, and watching over its hearth, make this terracotta figure unique. It will later be discussed as a key feature in the spiritual life of Neolithic man in Macedonia (Fig. 6).

This repertoire of various movable pottery artifacts including the terracotta figurine of the Great Mother, but also the impossibility of drawing an adequate analogy, led the researcher to define this building as a public one, i.e. as a Neolithic sanctuary[4]. In later research conducted in other

Fig. 4 Askos, Tumba Mađari.

4 Sanev 1988.

Fig. 5a–b Cup and amphorae, Tumba Mađari.

Fig. 6 Altar from the Great Mother cult, Tumba Mađari.

houses, similar fragments of anthropomorphic cylinders, and various-sized models of houses were also discovered. Vessels identical to the amphorae, cups and askoi, with the same decorations, also appear during later excavations. This is in line with the observation according to which every home had its own domestic sanctuary, i.e. place for the exercise of cult and religious practices. Taking this into consideration, we believe that this was a residential house situated at the periphery of the settlement.

Anthropomorphic Sculpture

The most common representation in anthropomorphic plastic art in Macedonia, in almost all Neolithic settlements, is the woman. In the Middle Neolithic stages, female figurines are steatopygic (or pear-shaped idols, as they are often called), made in two halves which were afterwards joined. The head is usually missing. Sexual characteristics are accentuated with an incised triangle. One of the figurines found in Tumba Mađari is sculpted from white stone, with an emphasized steatopygia, small breasts, thin neck and clutched arms; the head is missing. It dates back to Anzabegovo-Vršnik II (Fig. 7a). A small white stone head with an emphasized nose was also discovered at this site. The sculptor exploited the natural shape of the stone. It is well formed, featuring a large nose, and a very small, barely distinguishable, trace of red paint on the forehead. At first sight it bears a formal resemblance to the later Cycladic idols, dating back to Anzabegovo-Vršnik IV[5] (Fig. 7b). In the Late Neolithic, statuettes appear to be thinner, and secondary sexual characteristics are represented. The shapes are elongated, with accentuated sexual characteristics and grey color. The hairstyle is usually represented artistically and in detail.

Zoomorphic Sculpture

This category of cult pottery is represented in all areas of the site. These are mainly animal representations of sheep, goats and oxen which in some cases have bowls set on their backs (Fig. 8a). We believe that these were used to offer sacrifices to ensure the wellbeing of the family.

As a random finding from Tumba Mađari, we would mention a piece of pottery representing the head of a ram (Fig. 8b). With life-size dimensions (32–33–27 cm), and openings which probably served to accommodate real horns, it suggests the cult of the ram or bull[6]. Since the back is com-

5 Zdravkovski – Stojanova Kanzurova 2009, 150 f.

6 Sanev 1996/1997, 15–24.

Fig. 7 a Female figurine, Tumba Mađar, b Stone head, Tumba Mađari.

Fig. 8 a Zoomorphic altar, Tumba Mađari, b Head of a ram, Tumba Mađari.

pletely smooth, it was probably applied to the facade of a house. Such bucrania are also found in the Neolithic sanctuaries in Çatalhöyük, Hacılar, Romania etc.

Funerals

The only information regarding the funeral ceremony of the inhabitants of this settlement dates back to 1985 when the remains of a child/baby, buried in a sleeping position, were discovered next to the southern wall of House 6. Also, the rooms in the other houses contained scattered children's bones[7]. During the latest excavations conducted in 2008, the jawbone of a woman in her forties was discovered[8]. This information is however insufficient for us to draw conclusions on the funeral ceremony.

7 Internal report on the archaeological excavations in Tumba Mađari, 1998, 2.

8 Internal report on the archaeological excavations in Tumba Mađari, 2008, 2.

Excavations 2002–2005

Archaeological excavations from 2002 to 2005 continued within the framework of the international project of the CNRS and the Museum of Macedonia[9].

The results from these excavations indicate the existence of new buildings whose parameters cannot yet be defined or isolated[10]. Out of the movable artifacts, the most recognizable one is a fish hook made of horn, unique when it comes to Neolithic sites in Macedonia[11] (Fig. 9a). It confirms the thesis that Katlanovo Lake Šamak and Ajvatovo swamp Blatija played an important role in the everyday life of the region's Neolithic people. Such big fish hooks were discovered at Neolithic sites in the Đerdap gorges. Several stone legs, bone needles and spatulas, and a small pintadera were also found. According to our findings, it is unique in terms of size and function – with a hole for a fishing-line. It features a double S spiral in the negative, well carved (Fig. 9b).

Among the items excavated was a cylinder made of clay, 14 cm tall (Fig. 10), from a Great Mother altar.

Fig. 9 a Fish-hook, Tumba Mađari, b Pintadera, Tumba Mađari

Fig. 10 Cylinder from a Great Mother altar, Tumba Mađari.

Excavations in 2007

Archaeological excavations in 2007 are a continuation of the 2004 research[12]. The excavations took place in an area of 13 × 10 m uncovering an 80 cm thick layer from the second cultural stratum of the settlement. What marked the excavations in Tumba Mađari was the archaeological situation in KV, G1, H2. At a depth of around 40–50 cm, 10–11 small immovable items of mud and straw were found, built one beside the other in an area of 3.50 × 1.50 m. Some of them are square, and others round. Due to the fragility of the mud and straw mixture it was difficult to determine the exact number of these items, and their shape. The dimensions vary from 37 to 60 cm. The wall height is 5 to 17 cm. A well smoothed bottom is visible in the better preserved items. However, they did not contain any remains of vegetable or animal origin, or fragmented pottery (Fig. 11). After these so-called tubs stopped being used, in the second construction stage of the southern part, they were covered with a platform of fine gravel and fragmented pottery. A fireplace was built on the

9 Project managers are Dr. C. Comange from the French CNRS and D. Zdravkovski, MA, from the Museum of Macedonia.

10 Information on the archaeological excavations was obtained from relevant archaeological reports.

11 Internal report on the archaeological excavations in Tumba Mađari, 2004.

12 Results from the latest archaeological excavations (2007–2008) were presented by E. Stojanova Kanzurova at the 20th symposium of MAND, 3.12.–6.12.2008, held in Kičevo, Republic of Macedonia. The publication of this presentation is underway.

Fig. 11 System of ›tubs‹, Tumba Mađari, 2007.

platform. Near the fireplace, remains of ashes, pottery vessels and animal bones were also discovered.

What makes this site unique is the discovery of a rare altar of what is known as the Great Mother type, excavated at the bottom of the abovementioned fireplace which was cut in order to observe its structure (Fig. 12). Only the lower part of the altar was preserved (height: 11 cm). The upper part (cylinder), was not preserved and for the time being we can only assume what it looked like. All four corners of the house-shaped altar feature small openings which gradually become smaller on the inside. These were probably used to insert a rope with which the altar was suspended on a wall or from a rafter of the house. All sides of the house-altar have elongated irregular openings on their base. The altar is unique due to the way it is sculpted as a house with foundations. The bottom contains two openings one next to the other, which surely have a symbolic meaning. The altars of this type discovered so far (in the Republic of Macedonia), the bottom contained only one opening. This altar is an older variant of the famous Great Mother altar discovered at this site in 1981.

Fig. 12 Altar, Tumba Mađari, 2007.

A similar system of so-called tubs is also found in the southern KP of KV H2. Among the remains of mud mixture three (possibly more) immovable items were discovered, which resemble the tubs from KV, G2 and H2. One of the partially damaged items is round with a cone finish. The other two are rectangular and round, respectively, and are considerably damaged. As with the previous items, the function of these three also remains unknown.

Excavations in 2008

In 2008, six additional squares in the second cultural stratum were opened, and the area of excavation reached 15 × 20 m. The emphasis was placed on the clarification of the archaeological situation in KV, G2 and H2 with the system of immovable artifacts – the so-called tubs (Fig. 13). During the excavation, a statuette was found in one of them, rather different from the ones discovered so far (Fig. 14). The unusual feature of this small statue in a sedentary position is the fact that it was formed from two materials, bone and clay, easily available to the sculptors. The Neolithic artist made this piece of art in clay, around the femur of a bird. Only the most important female attributes and features are emphasized. The statue is of a seated woman of elongated vertical shape. Unfortunately, the head is broken off, but our assumption is that it was quite schematically sculpted, without any details. The neck is long and transforms into a torso with small emphasized breasts. The hands are emphasized. The torso is thin and flattened and continues into a well-shaped round bottom, with short stumpy legs. The only accentuated part of the figurine is the bottom, with prominent steatopygia, from which the legs derive. Since it was found in an in situ position, this points to the possible purpose and function of these tubs.

There are, however, not many analogies to this system of tubs. In house 6, excavated in 1988–1990, an immovable object was discovered, consisting of several small but deep tubs, covered on the inside with several thin layers of stirred clay. Its function could not be determined. The analogy suggested by the researcher is the one of organized ›cassettes‹ within the altar found in Vrbjanska Čuka

Fig. 13 System of ›tubs‹, Tumba Mađari, 2008.

site[13]. Partial analogies were found in Tumba Stenče[14], Porodin[15], Zelenikovo[16] and particularly Vrbjanska Čuka[17] in Pelagonia (Fig. 15).

The western part of this system contained a pintadera with a long, oval form and a small pierced vertical handle. The sides feature incised vertical lines, and a long wavelike line is carved on the head. An attractive necklace composed of 19 beads was discovered in the northern part of this system (Fig. 16). The beads are made of various stones, and two of them are made of animal bones. Most of them have an elongated bi-conal shape, whereas the others are round. The length of the largest beads is up to 1.8 cm, and the smallest ones range up to 4 mm.

In the KP between KV I2–3, an oven with several stages of usage and refurbishment was found. It has an irregular round shape, with dimensions of 1×1 m and height of 36 cm. An immovable rectangular object was discovered on the eastern side of the furnace. The dimensions of this irregular rectangular object are 70×75 cm. Due to the lack of elements and adequate analogies, the function of this object cannot yet be defined. These two objects are connected by a channel in the southeast part of the oven. The side of the oven facing south contains preserved fragments of mud and straw mixture from another immovable rectangular object whose purpose has not yet been identified (Fig. 17).

As for the movable archaeological material in the northern excavated area (KV F2), a rare bone amulet with a length of 7.5 cm was found (Fig. 18). The amulet is a masterpiece by a Neolithic artist[18]. According to one's personal perception, various Neolithic animal forms can be distinguished on the amulet. The closest analogy is found in the settlements from the Đerdap complex, in particular Lepenski Vir. In KV F3, a square altar with high walls was excavated. The preserved corners finish in small hemispherical humps

According to the pottery found, the most common type is rough and medium pottery. Fine pottery is rarely present. Medium pottery is made of purified clay and it is well fired in red and ochre color. Pottery fragments come from medium

13 Internal report on the archaeological excavations in Tumba Mađari, 1990, 5
14 Zdravkovski 2005, 26.
15 Grbić et al. 1960.
16 Garašanin – Bilbija 1988, 31–41.
17 Mitkoski 2005, 33–46.
18 A similar bone amulet from Vlasac is presented by Borić, fig. 15, in this volume.

Fig. 14 Female figurine, Tumba Mađari, 2008.

to small vessels, rarely from bigger ones such as pithoi. The most frequent forms are plates, cups and a few askoi. They are decorated with barbotine, various impressions made with nails, bones or other objects, and strips in the form of wreaths. The rim is often flat, sometimes slightly pulled outwards and the handles are strip-like.

The proportion of fine pottery is considerably smaller. Its external and internal polishing is of high quality. The most frequent fragments are of cups red in color and with a small ring-like hollow leg. Almost all painted motives characteristic for all stages of the Middle Neolithic are present. These are: vertical triangles beginning at the rim which is slightly pulled outwards, small triangles on the rim itself, small diagonal lines on the rim, with grouped lines down the entire body underneath, cross-hatched triangles, spirals and web-like ornaments painted in brown. Some shallow diagonal fluting characteristic for the end of Middle Neolithic also appear.

In the lower strata, 4–5 fragments of white painted pottery related to the end of Early Neolithic were also discovered. Such fragments were excavated in recent years, which is an indicator that this settlement existed in the Anzabegovo-Vršnik I phase.

Fig. 16 Necklace, Tumba Mađari.

Fig. 15 System of ›tubs‹, Vrbjanska Čuka.

Fig. 17 Oven, Tumba Mađari.

Fig. 18 Bone amulet, Tumba Mađari.

Cult Altars

The most commonly found fragments of cult altars are legs of the table type, in different variants, as well as fragments from the Great Mother-type altars (Fig. 19a, b).

Fig. 19a – b Fragments of cult altars, Tumba Mađari.

Tools

The entire area of excavation contained a considerable number of tools made of various animal bones and stones. Different types of bradawls, needles and spatulas were made of bone, as well as some other tools whose purpose has not yet been identified. The items made of stone were mostly mashers, planes, sharpeners, mills for grain, hatches, chisels and knives.

According to their chronological and cultural value, parts of the movable material from the 2007 and 2008 research corresponds to the forms and decoration of the Anzabegovo-Vršnik III cultural group. However, some shapes of pottery production, globular vessels, half-globular vessels and the two female figurines point to an older phase of this cultural group, i. e. Anzabegovo-Vršnik II.

The few fragments of white painted pottery can be related to the end of the Early Neolithic.

Fig. 20 Stone object ›horns of consecration‹, Tumba Mađari.

Excavations in 2009

The excavations were conducted in order to define the vertical stratigraphy of the area which was partially excavated in 2007 and 2008. The tubs discovered in the last campaign

Fig. 21 Village of Taor, Skopje, 1952.

Fig. 22a – b The Neolithic village at site Tumba Mađari, 2009.

were removed so that they could be conserved and reconstructed prior to presentation. A small sounding area (1.5 × 1.5 m) was opened at the location of the tubs. The investigation of this area finished with a sterile layer of clay and water. This meant that the end of the cultural stratum of this Neolithic settlement had been reached.

Houses as complete entities could not be defined during the research. With regards to movable material, especially pottery, the same forms as in the previous excavations were found, with the exception of painted decorations. The vessels were mostly decorated in the impresso technique, barbotine, and in some cases with wreath-shaped strips. Most of the pottery was of a red color – rarely gray.

In the area between KP X3–I3, a small stone object similar to the ›horns of consecration‹ was found, without an apparent archaeological context (Fig. 20). Two similar objects were found in Tumba Mađari, but made of clay. Analogies can be found in the early Neolithic settlement of Rakitovo in Bulgaria, where 33 similar pieces made of clay were discovered. Some of them were interpreted as phalli or bucrania[19]. Out of the items made of animal bones, one unusual one is a fragment whose purpose is unknown.

Cult Altars

Out of this group of cult altars, a very small number of fragments of the Great Mother type and table type in several variants were discovered.

Most of the newest archaeological material corresponds to the shapes and decoration motives of Anzabegovo-Vršnik II. However, some forms of pottery production, such as several fragments of painted cups, as well as fragments of altars of the Great Mother type, point to the Anzabegovo-Vršnik III cultural group. The excavations in the second cultural stratum partly complete the image of the urban, economic, spiritual and cultural evolution of this settlement.

Neolithic Village of Tumba Mađari

The Tumba Mađari site, with its artistic and aesthetic values of material and spiritual culture, was recognized by archaeologists; but regretfully, in this last decade, due to lack of funds and inadequate institutional and local care, it was turned into a dump and slowly fell into oblivion.

In this period when caring for cultural heritage is one of the highest national priorities, an archaeological project for the reconstruction of the Neolithic village of Tumba Mađari was presented and unconditionally supported[20]. The aim of this idea to reconstruct Tumba Mađari was twofold – to revitalize the site and to develop among members of the public an appreciation of the earliest cultural achievements of our ancestors.

The reconstruction of Neolithic houses in Tumba Mađari was based on relevant sources: archaeological findings; the appearance of pottery models – altars – houses from the Neolithic, the Anzabegovo-Vršnik and Velušina-Porodin cultural groups, as well as houses in the surrounding villages, which retain their building traditions for a very long time, practically millennia (Fig. 21).

So far, three Neolithic and several other buildings intended for visitors have been constructed. The construction of one more Neolithic house is also planned. The houses are built in the spirit and style of Neolithic architecture, using natural materials (clay, wood, straw, hay). Their interiors contain copies of the movable and immovable objects discovered by archaeologists, as well as representations of people going about their everyday activities[21] (Fig. 22a, b).

Grnčarica Site, near the Village of Krupište

The Grnčarica archaeological site is situated southeast of the village of Krupište, in the Bregalnica river valley, on a slightly flattened plain, and an area of around 1 ha. It was subject to research in 2007 and 2008. The results have not been systematized yet, but the preliminary conclusions obtained from researchers point to the following[22]: the site has a very thin cultural layer of 0.25–1.30 m with two phases: the more recent one dating to the Roman period, and the earlier one belonging to the Early Neolithic, i.e. Anzabegovo-Vršnik I phase. The Neolithic settlement is of the river terrace type with one cultural horizon. Architectural remains are very modest because they were severely damaged by farming. Many postholes have been discovered, as well as rubbish pits. Many artifacts made of local stone were also found. Some of the items excavated were a fireplace and an oven set in soft sandstone. According to the researchers and our examination of the pottery found, it can be concluded that the most characteristic are monochrome vessels of globular shape and with pierced vertical handles, and large plates with a smooth surface and red color (Fig. 23a–d). Barbotine and impresso pottery are less well represented. In spite of the size of the excavated area, no painted pottery was found. As regards plastic art, only one fragmented female figurine was discovered. The remains of an adult male were also found, set in a shallow pit in a rock, without any grave goods[23] (Fig. 24).

19 Radunčeva 2002, 33. 142; fig. 22.

20 Authors of this project are E. Stojanova Kanzurova and D. Zdravkovski, PhD, archaeologists from the Museum of Macedonia.

21 More information on the site and the Neolithic village in Tumba Mađari can be found on the website <http://www.tumbamadzari.org.mk>.

22 Report on the Completed Protective Archaeological Excavations at the Sites Threatened by the Construction of the Multipurpose Hydro System Zletovica, 2008. The project manager is T. Nacev, MSc from the Institute and Museum Shtip. The manager of Grncarica site is T. Jovčevska from the Museum in Veles.

23 Report on the Completed ProtectiveArchaeological Excavations at the Sites Threatened by the Construction of the Multipurpose Hydro System Zletovica, 2008.

Fig. 23a – d Pottery vessels, Grnčarica.

Fig. 24 Remains of an adult male, Grnčarica.

Pod Selo-Tumba Stenče, Tetovo Site

The archaeological site of Pod Selo-Tumba is located on the right bank of the Vardar River near the village of Stenče, Tetovo[24]. The movable and immovable archaeological material from the seven soundings conducted demonstrated that this is a Neolithic site with a long chronology, dating back to the Early (white painted pottery) up to the end of the Middle Neolithic (brown painted pottery)[25]. The Late Neolithic stratum has been partially destroyed. In some soundings on the periphery of the settlement, finds were present in situ. Four soundings resulted in the discovery of the remains of a house built in a manner typical for Neolithic architecture in the region. The house has not yet been fully researched. Its interior contained an oven for baking bread, in a hemispherical shape. This sort of oven is found in the settlements of Tumba Mađari[26], Slatina-Zelenikovo[27], Mramor, village of Čaška[28], Cer-

24 The first excavations were conducted by the Museum of Macedonia in 2000, managed by D. Zdravkovski, archaeologist.
25 Zdravkovski 2005, 30.
26 Sanev 1988.
27 Garašanin – Bilbija 1988.
28 Jovčevska 1992, 31–41; fig. 3, 4.

je-Govrlevo[29]. Researchers interpreted some of these immovable objects as cult objects – altars. An immovable artifact was found in House 1 – a so-called tub made of mud and straw mixture with a smoothened top.

Among the remains of the house, dating back to the early Neolithic, an altar was discovered which represents an older form of the prehistoric cult of the Great Mother as the guardian of the home and family[30] (Fig. 25). It is a cylinder set as a chimney over a rectangular shaped base representing the house. The sides feature openings – two rectangular and two in the shape of the letter M. Two plates discovered belong to the Early Neolithic stratum, with analogies to Pelagonia, as well as one round vessel in a reddish-brown color and with bead-like handles.

The most impressive layer is the one from the Middle Neolithic, characterized by various stone and bone tools and pottery products. The latter are vessels for everyday use, both of rough and ›luxury‹ make. The most frequent forms are cups, askoi, pots, plates etc. An interesting category of objects are statuettes and fragments of anthropomorphic altars of the Great Mother type, well known from the Middle Neolithic in Tumba Mađari, Skopje. Pottery makers from the Middle Neolithic in the Pod Selo settlement present the anthropomorphic nature of this altar with many different modern hairstyles, including the afro. Excavations showed that the Great Mother cult was the main cult of Neolithic people living in the settlements of the Skopje region and Polog valley. This cult was also recognized in the Tumba settlement of Dolno Palčište in the same northwestern part of Macedonia[31]. In the devastated strata, fragments of finely-made pottery vessels painted in white color on a red background were discovered.

The stratum from the late Neolithic period is partly destroyed, and in situ is present in some soundings at the periphery of the settlement. Two very well preserved cups belong to this period. One of them is of shiny grey color with fluting on the shoulder. The second one is brown in color.

Fig. 25 Altar, Stenče.

The fluted cup continues to exist as a form during the Early Neolithic period, which is proved with the cup found in Markova Sušica near Skopje, belonging to the Early Neolithic according to the graphite decoration of its inside (Fig. 26a, b).

Fig. 26a – b Cups, LN, Stenče.

29 Bilbija 1986, 35 f.
30 Zdravkovski 2005, 27.
31 Saržoski – Zdravkovski 1990/1991, 131–134.

Excavations in 2007

New excavations in 2007 were conducted in order to complete the research and monitor the situation from 2000. Two soundings were opened in the immediate proximity to the ones from 2000[32]. They contained remains of mud and straw with regards to immovable inventory, two objects were discovered – an oven with a hemispherical base and, on its southwest side, a rectangular object of the type we have called a tub. The two items were part of the food preparation process. In this archaeological campaign, the foundation of the house has not been fully excavated.

As for movable materials, besides fragments of various pottery vessels, several fragments of white and brown painted pottery are recognizable, fragments of anthropomorphic altars similar to the Great Mother altar from Tumba Mađari, table altar fragments, bone tools, stone tools, pottery utility items.

The results of these excavations enable this settlement to be culturally and chronologically related to Pelagonia in its later phase. The subsequent phases are related to Anzabegovo-Vršnik II – IV cultural group, i.e. to relate it to the relevant settlements from the Skopje region, with which it had intensive communication thanks to the easy passage from one valley to the other.

Džuniver Site, near the Village of Izvor, Veleš

Džuniver site is located near the village of Izvor and the town of Veleš. According to the results from several years of excavations (1999–2001), this site was identified as a Neolithic settlement with a period of existence from the Middle to the Late Neolithic[33].

So far, the only information available is only on the object that the researcher defined as an altar. The researcher bases her arguments for this on the absence of immovable items (ovens, fireplaces) and movable goods for everyday use.

There are several archaeological situations and objects intended for cult purposes. A terracotta bucranium (bull) without horns was found in a central location. The sanctuary also contained an arrangement of three stones with different dimensions and forms, related to the fertility cult[34].

Near this entity and in the southern part of the sanctuary, several small stylized female figurines were discovered. Near the entrance, in the northern part of the sanctuary, carved rock crystal was found. The crystal and its symbolism additionally enrich the repertoire of movable artifacts in the sanctuary.

The traces of ash in the pits are related to the act of purifying and illuminating the earth. Setting up a fire in the pit relates to the life created in a mother's womb – a reference to the Mother Earth cult.

All these observations, supported by findings, allow the researcher to identify this building as a place for rituals related to the fertility cult, which was of great importance to the Neolithic community.

Kutline Site, near the Village of Rakle, Prilep

Kutline site is located near the village of Rakle in Pelagonia[35]. According to its shape, this settlement is of the ›garden‹ type, spread on a natural terrace and distinguished from the usual type of prehistoric settlements of the ›tumba‹ type in Pelagonia[36]. An area of 23 m^2 has been excavated, with stratigraphic data defining two horizons of the settlement. The modest results do not offer sufficient data on the architecture of the settlement.

The predominant archaeological material consist of pottery vessels of average make, a smaller number of fine pottery vessels, and very rarely, roughly-made vessels. The predominant pottery vessels are black, brown and occasionally red in color (Fig. 27a – c). Typical are black vessels whose surface has been given an almost metallic finish through polishing. In the analysis of pottery, researchers defined sixteen types of vessels[37]. Most frequent shapes are cone-shaped and bi-conal-shaped plates with various typological specificities. Several types of handles with triangular, strip- and tunnel-like shapes have also been identified. The manner of decoration features linear motives made by incision, the so-called plastic rib, decorated with nail incisions.

Plastic art features anthropomorphic figurines representing a woman in the late stage of pregnancy, figurines consisting of two parts, and prosopomorphic figurines. Two sculptures were randomly discovered by farmers – a pillar-like head with a detailed bird face, and a female figurine consisting of two parts, with a flattened body and clothes emphasized by means of incisions and round plastic applications. Particularly interesting are two terracotta fragments of realistically represented fingers.

The Kutline site existed in the time of the Late Neolithic presented in Anzabegovo-Vršnik IV cultural group.

32 Internal report on the archaeological excavations in the Neolithic Settlement of Pod selo – Tumba Village of Stenče, Tetovo, 2007.
33 Jovčevska 2006, 39; Grozdanov 1996, 77.
34 Jovčevska 2006, 44.
35 In 2002, the Institute and Museum of Prilep performed archaeological soundings in order to determine the chronological and cultural framework of the settlement.
36 Temelkoski – Mitkoski 2008, 93.
37 Temelkoski – Mitkoski 2008, 96–101.

Fig. 27a – c Pottery vessels, Kutline.

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Adaptations and Transformations of the Danube Gorges Foragers (c. 13.000–5500 BC): An Overview

by Dušan Borić

Introduction

There are few regions in Eurasia with well-documented archaeological sequences that offer abundant settlement and mortuary data for understanding processes involved in forager-farmer transformations. The Danube Gorges of the central Balkans is one such area (Fig. 1). The Mesolithic-Neolithic sequences in the Danube Gorges of the central Balkans provide evidence of in situ cultural developments amongst populations that settled in this particular area as part of global post-Pleistocene adaptations. The nature of postglacial adaptations amongst southeast European foragers eventually led to the acceptance of the Neolithic ways of existence in this and other regions of Europe. These forager communities developed a specific cultural vocabulary that itself changed over time. Their final transformation took place under external causes in the last centuries of the 7th millennium BC. The arrival/emergence of the first farming communities around 6300 BC in the surrounding areas of the Balkans triggered a fascinating example of cultural hybridity of forager-farmer interactions in the Danube Gorges that lasted probably not longer than two centuries on the basis of the Bayesian modeling of a series of new AMS dates from the site of Lepenski Vir (see below). This cultural hybridization was expressed in all aspects of life, from body decoration, the appearance of artistic depictions and elaboration of architectural symbolism. Hence the nature of adaptations and transformations that can be examined on the basis of abundant archaeological evidence from this region is exemplary for the character of foraging societies that might have existed in the Balkans and other areas of Eurasia during the Early Holocene.

The material record, which spans some 3000 years of the Final Pleistocene (c. 13.000–10.000 BC) and around 4500 years (c. 10.000–5500 BC) of Early Holocene foragers' adaptations and transformations, demonstrates remarkable continuities[1]. The region is well-known due to the unique

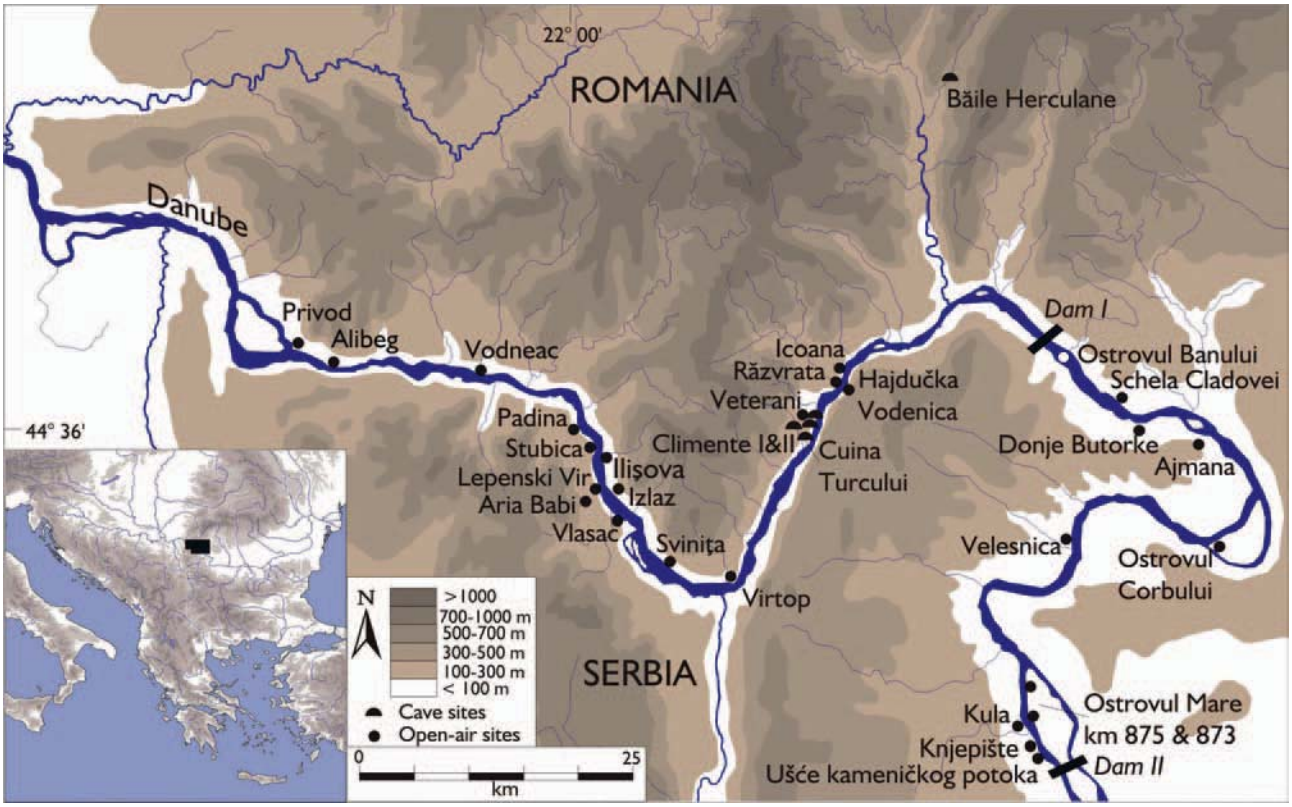

Fig. 1 Map of the Danube Gorges showing principal Epipalaeolithic, Mesolithic and Neolithic sites.

1 e.g. Bonsall 2008; Borić 2002a; Borić 2002b; Borić 2007a; Borić 2007b; Borić – Miracle 2004; Chapman 1993; Radovanović 1996; Radovanović 2000; Srejović 1972; Whittle 1996; Tringham 2000.

statuary and architecture found at the type-site of Lepenski Vir. Yet early excavations of sites in this region remained sporadically published and often were characterized by a low resolution of archaeological recording. In the past decade or so, some important advances have been made in improving the current state of research: (1) some previously unpublished data from old excavations have now been published or are being prepared for publication, (2) archaeometric analyses (isotopic analyses and radiometric dating) have been made on the material from the 1960 s – 1970 s and 1980 s excavations, and (3) novel evidence came to light through new excavations conducted at two sites in the region – Schela Cladovei and Vlasac – by applying higher standards of recording than available during first investigations of these sites. This burgeoning corpus of new data provides the opportunity for a critical appraisal of conclusions about Mesolithic and Neolithic sequences in this region. The quantity and sophistication of these new data, as well as possibilities for their interpretation, has expanded greatly in the last decade, i. e. since the last synthesis of this material by Ivana Radovanović[2]. These new results fundamentally change the current understanding of chronologies and stratigraphies, subsistence, mobility and settlement patterns as well as the nature of forger-farmer interactions in this region. This paper provides an up-to-date review of this new data.

Landscape Setting and Research History

The particular environment of the Danube Gorges, consisting of three large gorges (Fig. 2) interspersed between river valleys, provides one of the best places in the region for fishing large species of migratory sturgeon and other river fish due to a specific geomorphology, in particular an irregular riverbed and whirlpools[3]. More recent ethnography and knowledge about the behavior of migratory species of fish contribute to our understanding of how particular spots along the Danube might have been connected with a specific type of whirlpool fishing[4]. Sites with Mesolithic-Neolithic sequences are located exactly at those places best for this type of fishing. The abundance of protein-rich resources in this region

Fig. 2 View of Kazan Gorge (Cazanlu Mare) where the Epipalaeolithic sites of Climente II, Cuina Turcului and Veterani Terrace were located (photo: D. Borić).

2 Radovanović 1996.
3 Bartosiewicz et al. 2008.
4 Borić 2002a.

might have contributed to the long-lasting existence and relative stability of the population over several millennia, a conclusion also corroborated by health index measurements[5].

The landscape of the Danube Gorges changed dramatically after the construction of the first hydroelectric plant on the Danube through the project that started in the 1960s and was completed by the end of 1971. The hydroelectric plant Đerdap (Iron Gate) I created an artificial lake behind it, raising the water level from 13 up to 30 m above the previous river level. In the course of this project, archaeological rescue excavations of endangered sites were undertaken from 1964 to 1971 as part of the Đerdap (Iron Gate) I project at the following Late Palaeolithic, Epipalaeolithic, Mesolithic and Early-Middle Neolithic sites: Alibeg (1971), Climente I (1965, 1968–1969), Climente II (1968), Cuina Turcului (1964–1969), Donje Butorke (1964), Hajdučka Vodenica (1966–1969), Icoana (1968–1969), Ilişova (1970) Islaz km 1004 (1970), Lepenski Abri (1968), Lepenski Vir (1965–1970), Ostrovul Banului (1966), Padina (1968–1970), Răzvrata (1967–1968), Schela Cladovei (1965, 1967–1968), Stubica (1970), Veterani Cave (1964–1965), Veterani Terrace (1967–1969), Vlasac (1970–1971) and Vodneac (1970).

Another phase of research was undertaken in the late 1970 s and early 1980 s as part of the Iron Gate II project and included several sites downstream of the gorges on both the left and right banks: Ajmana (1981–1982 and 1984), Knjepište (1982–1983), Kula (1980–1984), Ostrovul Corbului (1972–1976, 1977–1980), Ostrovul Mare km 873 and 875 (1978), Ušće kameničkog potoka (1981), Velesnica (1981–1982)[6]. In addition, the site of Băile Herculane-Peştera Hoţilor, found some 18 km north of the Danube on the bank of the Cerna River in Romania, is frequently linked with the traces of Epipalaeolithic occupation in the Danube Gorges (see below). The site was excavated in 1954–1955 and more intensively in 1960–1961; the sequence contains Mousterian, Upper Palaeolithic and Epipalaeolithic/Mesolithic levels[7].

To-date, only at the sites of Schela Cladovei and Vlasac have recent excavations been possible. At Schela Cladovei, explorations were conducted over several decades: from 1982 to 1991 by Vasile Boroneanţ[8], from 1991 to 1997 through a joint British-Romanian project by Vasile Boroneanţ and Clive Bonsall[9] and from 2001 to 2002, as well as in more recent years, by Adina Boroneanţ and Vasile Boroneanţ[10]. At Vlasac, new archaeological investigations took place from 2006 to 2009[11]. New excavations at Vlasac are part of a wider research initiative that started on the Serbian side of the Danube in 2004 through a collaborative Serbian-British project »Prehistory of north-east Serbia« between the Department of Archaeology, University of Cambridge, UK, and the Department of Archaeology of Belgrade University, Serbia. A part of this wider project relating to the Stone Ages has been designed to test the notion of the Mesolithic-Neolithic frontier as a general model as well as its applicability in this regional example through the investigation of hinterland areas on the Serbian side of the Danube. No previous systematic survey of the hinterland areas of the Danube Gorges was made after the initial excavations of endangered Mesolithic-Neolithic sites on the banks of the Danube. One of the outcomes of the survey of the immediate hinterland zone of the site of Lepenski Vir, on Košo Hill, was the discovery of the Early/Middle Neolithic open-air site of Aria Babi in 2004. The site was excavated in 2004–2005[12] (see below) (Fig. 3).

Fig. 3 View of the Upper Gorge of the Danube from the Neolithic site of Aria Babi on Košo Hill; the arrow indicates the location of the Meso-Neolithic site of Vlasac; the trapezoidal Treskavac Mountain visible on the far left side of the photo is located across the Danube from Lepenski Vir (photo: D. Borić).

5 Bonsall et al. 1997.
6 For a more detailed history of field research on the Danube banks see Boroneanţ 2000, 11–15; Radovanović 1996, 3–8.
7 Nicolăescu-Plopşor et al. 1957; Mogoşanu 1978b; Dinan 1996a.
8 Boroneanţ 1990; Boroneanţ 1993; Boroneanţ 2000; Boroneanţ – Nicolăescu-Plopşor 1990.
9 Bonsall et al. 1997; Boroneanţ et al. 1999.
10 Boroneanţ – Dinu 2005/2006, footnote 17.
11 Borić 2006; Borić 2007b; Borić 2008; Borić 2010; Borić et al. 2008; Borić et al. 2009.
12 Borić 2007b; Borić – Starović 2008.

Chronological Synchronizations

The following review does not provide a detailed history of the evolution of particular ideas held by various authors with regard to the chronology and interpretations of the sequences discovered in the Danube Gorges. Various useful reviews can be found in several other publications[13]. Instead, here the goal will be to examine to what extent some of these older chronological synchronizations and phasings, or ›stages of development‹ have stood the test of time in the light of various strands of the most recent data, especially when older models are confronted with a now substantial series of radiometric dates obtained for a number of key sites in the region (Appendix 1). One is reminded that such evaluations are those of the present author and may not be shared by other specialists working in the area. This observation may particularly hold true when it comes to the preferred definitions of particular periods (e.g. Epipalaeolithic, Mesolithic, Neolithic). While in some instances differences in the labeling of periods underline important conceptual disagreements in the understanding of processes of transformations in the past, it is more often the case that the use of one or the other block-of-time label is nothing but a preference of authors with regard to their particular perspective in choosing one designation over the other. For my part, here I will try to make it explicit why I prefer the use of certain labels to designate particular historical epochs covered herein.

In the past two decades, several dating projects, facilitated by the Oxford Radiocarbon Accelerator Unit and the NSF Arizona AMS Facility, focused on clearing up stratigraphic and chronological matters by dedicated absolute dating of human burials, modified and unmodified animal bones and in only one instance charred plant remains from various contexts of seven sites, in addition to a number of existing conventional dates made on charcoal in early years of radiometric dating (Table 1; Fig. 4).

These series of new dates have clarified significantly the problem of Mesolithic-Neolithic transition, establishing a realistic chronological framework for a number of important contexts, such as trapezoidal buildings with boulder artworks at the sites of Lepenski Vir and Padina as well as both extended supine and crouched burial positions. The clarification of chronological details was critical for gaining a new understanding about the nature and pace of culture changes, allowing one to suggest more nuanced and detailed scenarios of cultural transformations that took place in the Danube Gorges.

On the other hand, in the course of dating archaeological samples at each of the aforementioned sites a consistent, collateral pattern emerged while clarifying the Mesolithic-Neolithic transformations: a small number of dates obtained, both on human and animal bones, turned out to be significantly older than the expected Late Mesolithic-Early/Middle Neolithic date. These early dates suggested that most of the sites in the Danube Gorges, where later Mesolithic and Neolithic occupations were attested, were used/occupied from the start of the Holocene, being continuously or intermittently occupied for almost four millennia. And, while the Late Mesolithic phase in the region and especially the Mesolithic-Neolithic transformation phase became significantly

Site		Charcoal dates	AMS dates			References
			H	A	P	
1	Ajmana	–	2	–	–	Borić – Price forthcoming
2	Alibeg	1	–	–	–	Boroneanț 2000
3	Băile Herculane	1	–	–	–	Dinu et al. 2007; Păunescu 2000, 146
4	Cuina Turcului	4	–	–	–	Dinu et al. 2007; Păunescu 2000, 342
5	Hajdučka Vodenica	–	6	–	–	Borić – Miracle 2004
6	Icoana	7	1	18	–	Dinu et al. 2007
7	Lepenski Vir	20	37	33	–	Bonsall et al. 2008; Borić – Dimitrijević 2007; Borić – Dimitrijević 2009; Borić et al. forthcoming; Borić – Price forthcoming; Whittle et al. 2002
8	Ostrovul Banului	2	–	1	–	Dinu et al. 2007
9	Ostrovul Corbului	5	–	–	–	Păunescu 1996
10	Ostrovul Mare	–	–	1	–	Dinu et. al. 2007
11	Padina	4	13	10	–	Borić – Miracle 2004; Borić – Price forthcoming; Whittle et al. 2002
12	Răzvrata	1	–	2	–	Dinu et al. 2007
13	Schela Cladovei	–	13	33	–	Bonsall 2008; Dinu et al. 2007
14	Vlasac	17	14	14	1	Borić et al. 2008; Borić et al. 2009
Totals		**62**	**86**	**112**	**1**	**Total = 260**

Tab. 1 Frequencies of radiometric dates and dated materials from the Epipalaeolithic, Mesolithic and Early/Middle Neolithic sites in the Danube Gorges with source references. H – human; A – animal; P – plant.

13 e.g. Boroneanț 2000; Boroneanț – Dinu 2005/2006; Radovanović 1996, 3–12.

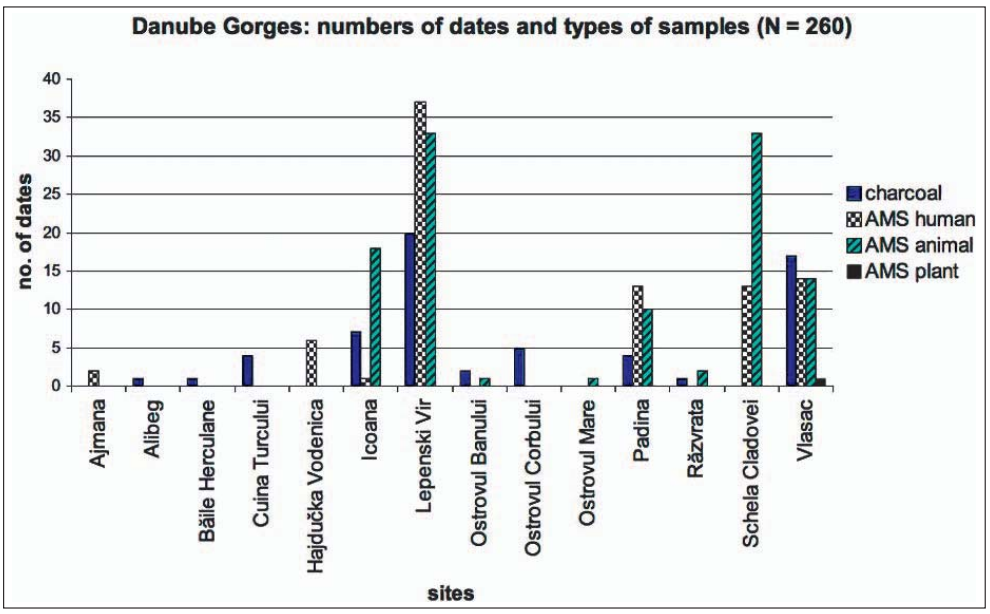

Fig. 4 Frequencies of dates for absolutely dated sites (Source: Table 1).

compressed – the former confined to the last centuries of the 8th and the first 800 years of the 7th millennium and the latter to the last two centuries of the 7th and the first century of the 6th millennium cal BC – a long span of over two millennia from around 9500 to 7400 BC, which can be labeled the regional Early Mesolithic, remains scarcely known. This period is now documented by absolute dates from six sites (Băile Herculane, Icoana, Lepenski Vir, Padina, Răzvrata and Vlasac) and is suspected at several other sites. Importantly, there are a number of Mesolithic burials from the aforementioned sites that can be dated to this early phase. Some of the burials are characterized by highly specific body positions (e.g. seated burials in lotus position from Lepenski Vir, Padina and Vlasac have all now been dated to the period from around 8400 to 7700 cal BC, suggesting a specific pattern of mortuary practices during this period[14], see below). There are also a few dates made on unmodified as well as modified animal bones that document the occupation at these sites as early as 9500 cal BC (see below). It is not surprising that this early phase remained elusive, being overshadowed by the later occupation and building activities, which in many instances must have disturbed and devastated early deposits rendering them less visible. This is clearly shown by the movement of residual materials from disturbed early deposits into chronologically several millennia later contexts, as in the case of a few reported instances from the site of Lepenski Vir and due to the massive construction of trapezoidal buildings in the period from c. 6200–5950 cal BC at the type site[15]. Yet, in a number of instances it has been possible to show the primary stratigraphic context for this early Mesolithic occupation, which at Vlasac, Padina and Lepenski Vir can frequently be found underneath later building structures. Whilst the Early Mesolithic occupation of the Danube Gorges is now documented, there is a significant disparity between the number of dates for this early occupation in the region and much better represented Late Mesolithic and Transformation/Early Neolithic periods (see Fig. 5).

On the basis of this body of radiometric data as well as evidence coming from various archaeometric analyses and new excavations (discussed in the following sections dedicated to particular chronological phases), one could suggest five major epochs from the Epipalaeolithic through to the Middle Neolithic periods in the Danube Gorges: Epipalaeolithic (13.000–9500 cal BC), Early Mesolithic (c. 9500–7400 cal BC), Late Mesolithic (c. 7400–6200 cal BC), Transformation period/Early Neolithic (c. 6200/6300–6000/5950 cal BC) and Early/Middle Neolithic (c. 6000/5950–5500 cal BC). In Table 2, these epochs/periods are synchronized first in relation to the occupation of particular sites on the basis of our up-to-date understanding of the absolute chronology of particular phases at these sites as well as convincingly established material culture associations in cases of insufficient radiometric evidence and, further, in relation to the schemes proposed by several authors who previously provided key influential periodisations for the Danube Gorges region. Keeping in mind that in the past decade or so we witnessed a dramatic change in our perception of the duration and character of particular phases in this region, it is important to expose main differences with regard to views that have until recently been taken as the authoritative proposals for the Mesolithic-Neolithic chronology of the Danube Gorges regions. In the following, the main strands of the evidence for each of these periods will be discussed along with the question of the reliability and reality of particular stratigraphic and chronological phases.

14 Bonsall et al. 2008; Borić – Miracle 2004; Borić – Price forthcoming.

15 Borić – Dimitrijević 2009; Borić et al. forthcoming.

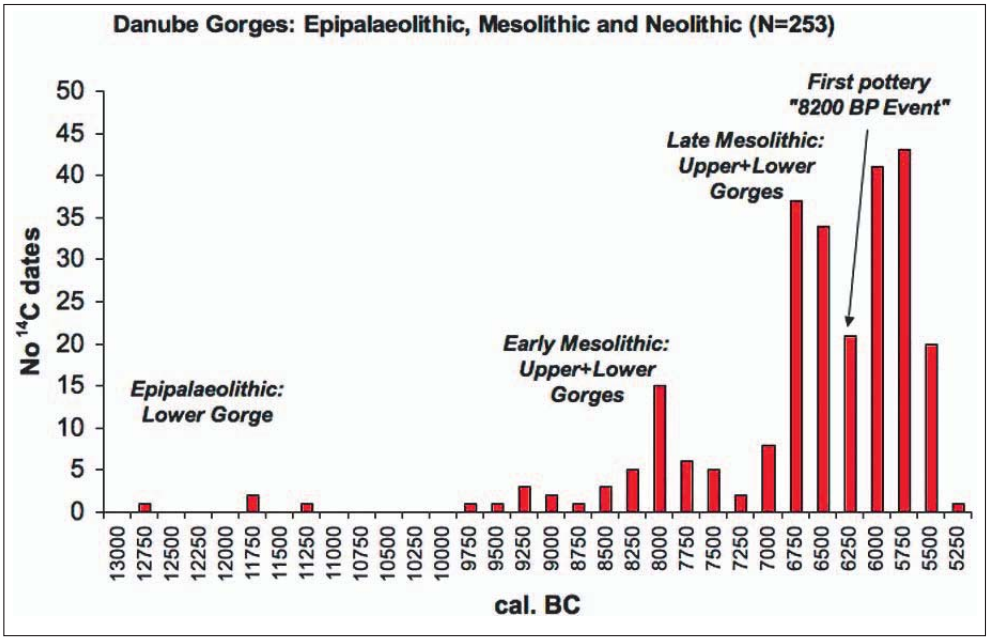

Fig. 5 Frequencies of radiometric dates for the period c. 13.000–5250 cal BC in the Danube Gorges (supplemented after Borić – Miracle 2004; Sources: Appendix 1).

Epipalaeolithic (c. 13.000–9500 BC)

The Epipalaeolithic phase in the Danube Gorges was recognized from the very beginnings of rescue work in this region in the mid-1960 s by Romanian archaeologists, some of whom were at the time already familiar with the Epipalaeolithic/Early Mesolithic finds from the site of Băile Herculane-Peştera Hoţilor excavated on several occasions, at the time, more than a decade earlier[16]. In order to emphasize the specific regional aspect of this Epipalaeolithic chronological horizon, at first primarily based on the characteristics of the lithic industry, the name Clisurean (after the local name for the Danube gorge – *clisura*) was given to finds from the rockshelter of Cuina Turcului and the cave sites of Climente II and Veterani[17]. More recently, Vasile Boroneanţ[18] equates this phenomenon with the Late Gravettian or Epi-Gravettian. The term Proto-Clisurean, on the other hand, designated the finds from the site of Climente I with the possible evidence of the Final Palaeolithic occupation that remains undated by radiometric dates at present. Finds from this cave represent an important diachronic link of the Epipalaeolithic period in the region to older Upper Palaeolithic occupations. Yet, in order to justify the assumption about a continuous development in the region from the supposed Upper Palaeolithic/Final Pleistocene phase at Climente I to the Epipalaeolithic phase at Climente II and Cuina Turcului much more evidence will be needed in the future. In the past, when labeling this Epipalaeolithic phase, some researchers made references to distant industries found in western Europe, such as Romanellian, Romanello-Azilian, Romanello-Clisurean (e.g. V. Boroneanţ, F. Mogoşeanu and Al. Păunescu). Such labels are rarely used today and are found to be inappropriate culture history constructs with little substance[19]. Yet the term Clisurean, if used to describe the characteristics of a specific type of Epipalaeolithic adaptation in the Danube Gorges, might not, after all, be such an inappropriate label, and could perhaps be revived in our discussions of the period and region, especially if in the future new Epipalaeolithic finds from the region allow us to provide a more detailed definition of this phase.

There are no major changes to the previous understandings of this regional phase by Srejović[20], Jovanović[21], Boroneanţ[22], Radovanović[23] and Voytek and Tringham[24] with regard to its duration at particular sites (Table 2). However, at present, we should be reluctant when attributing early phases I–II, and especially IIIa, of Ostrovul Banului to the Epipalaeolithic, as it has been by the above mentioned authors only on the basis of the typological characteristics of the lithic material from this site. One recent AMS date (AA-66370: 8219±87 BP [7350–7080 cal BC at 1 s.d.][25]) and two previous conventional dates (Bln-1080: 8040±160 BP [7180–6690 cal BC at 1 s.d.] and Bln-1079: 7565±100 BP [6510–6340 cal BC at 1 s.d.][26]) from Ostrovul Banului rather suggest the Late Mesolithic occupation of the site from the

16 Nicolăescu-Plopşor et al. 1957; Dinan 1996a.
17 Nicolăescu-Plopşor et al. 1965; cf. Boroneanţ 2000, 11.
18 Boroneanţ 2000, 242.
19 cf. Boroneanţ – Dinu 2005/2006, 45. 48; who similarly doubt the usefulness of the term ›Tardenoisian‹ to describe various facets of the Mesolithic industries across Europe; see also Dinan 1996b.
20 Srejović 1988; Srejović 1989.
21 Jovanović 1969.
22 Boroneanţ 2000.
23 Radovanović 1996.
24 Voytek – Tringham 1989.
25 Dinu et al. 2007, tab. 1.
26 Boroneanţ 2000, 86.

Based on radiometric dates		Srejović		Jovanović		Boroneanţ		Radovanović		Voytek and Tringham	
Period	***Site/phase***	***Period***	***Site/phase***	***Period***	***Site/phase***	***Period***	***Site/phase***	***Period***	***Site/phase***	***Period***	***Site/phase***
***Early/Middle Neolithic* (c. 5900–5500 BC)**	Ajmana Aria Babi C. Turcului III D. Butorke H. Vodenica Icoana L. Vir III Lepenski Abri Padina B S. Cladovei Velesnica Vlasac IV	*Middle Neolithic* *Early Neolithic*	L. Vir IIIb C. Turcului III L. Vir IIIa Padina B3	*Early Neolithic 3* *Early Neolithic 2*	L. Vir III Padina B3 L. Vir I–II Stubica I–II Padina B1–2	*Early/ Middle Neolithic Starčevo-Criş*	Alibeg Climente I C. Turcului III Gura Ponicovei Icoana O. Banului Pojejena S. Cladovei Veterani Cave	*Mesolithic – phase 6* (c. 6000–5500 BC)	H. Vodenica Ib LV II O. Corbului II (H.VII) O. Mare km 873/875 Padina B(III) Răzvrata II	*Early Neolithic*	C. Turcului III L. Vir IIIb O. Banului IV Icoana III S. Cladovei III
***Transformational/ Early Neolithic* (c. 6300–6000/ 5950 BC)**	Ajmana Alibeg H. Vodenica L. Vir I–II Padina A–B Stubica Vlasac	*Mesolithic/ Neolithic*	Alibeg Kula Padina B2	*Early Neolithic 1*	Proto-LV	*S. Cladovei – L. Vir culture – stage IV*	Alibeg II O. Mare km 873/875 Padina B	*Mesolithic – phase 5* (c. 6300–6000 BC)	Alibeg II H. Vodenica Ia Kula I–II LV I(3) O. Banului IIIb O. Mare km 875 Padina B(II)	*Mesolithic/ Neolithic*	Alibeg L. Vir IIIa O. Mare III Padina B
***Late Mesolithic* (c. 7400–6300 BC)**	H. Vodenica Icoana Kula O. Banului O. Corbului O. Mare Padina A(II) S. Cladovei Velesnica (?) Vlasac	*Late Mesolithic*	H. Vodenica L. Vir I–II Icoana II O. Banului IIIb Padina B1 S. Cladovei II Vlasac II–III	*Later Mesolithic*	Icoana I-II O. Banului II–III Padina A Răzvrata S.Cladovei I–II	*S. Cladovei – L. Vir culture – stage III*	L.Vir I-II O. Banului IIIb Padina A S. Cladovei II Vlasac	*Mesolithic – phase 4* (c. 6500–6300 BC) *Mesolithic – phase 3* (c. 7000–6500 BC)	H. Vodenica Ia Kula I L. Vir I(2) Icoana (?) O. Banului IIIa–b O. Corbului II (H.V–VI) Padina B(I) S. Cladovei II Vlasac III H. Vodenica Ia Kula I L. Vir I(1) Icoana (?) O. Banului IIIa–b O. Corbului II (H.V–VI) Padina A–B S. Cladovei II Vlasac Ib-II	*Late Mesolithic*	Icoana II L. Vir I–II O. Banului IIIb O. Corbului III Padina A Răzvrata II S. Cladovei II Vlasac II–III

Tab. 2 Synchronizations of existing periodisations for the Danube Gorges Epipaleolithic, Mesolithic and Neolithic sequences. First two columns: periods and sites/phases for identified stages in the diachronic development of the Danube Gorges from the Final Upper Palaeolithic through to the Middle Neolithic primarily based on currently available radiometric dates and, where no radiometric dates are available for particular sites and phases, dated on the basis of the material culture associations (e. g. Early/Middle Neolithic pottery). Subsequent columns synchronize this provisionally suggested scheme with chronological schemes previously proposed by D. Srejović (1988, 15; Srejović 1989, 483), B. Jovanović (1969), V. Boroneanţ (2000, 201–203), I. Radovanović (1996, 286–289) and Voytek and Tringham (1989, 494 f.).

Based on radiometric dates		Srejović		Jovanović		Boroneanţ		Radovanović		Voytek and Tringham	
Period	***Site/phase***	***Period***	***Site/phase***	***Period***	***Site/phase***	***Period***	***Site/phase***	***Period***	***Site/phase***	***Period***	***Site/phase***
						S. Cladovei – L. Vir culture – stage II	Icoana I O. Banului IIIb Răzvrata S. Cladovei I	*Mesolithic – phase 2* (c. 7000 BC)	H. Vodenica Ia O. Corbului I (H.III–IV) O. Banului IIIa Padina A/A–B Proto-L. Vir S. Cladovei I Vlasac Ia–b		
								Mesolithic – phase 1 (c. 7500–7000 BC)	Alibeg I Icoana Ia–b O. Corbului I (H. II) Padina A Răzvrata I S. Cladovei I Veterani Terrace Vlasac Ia		
***Early Mesolithic* (c. 9500–7400 BC)**	H. Vodenica (?) Icoana O. Banului (?) Padina A(I) Proto-L. Vir Răzvrata Vlasac	*Early Mesolithic*	Icoana I O. Banului IIIa Padina A Proto-L.Vir S. Cladovei I Vlasac Ia	*Earlier Mesolithic*	Climente II C. Turcului I–II O. Banului Veterani	*S. Cladovei – L. Vir culture – stage I*	O. Banului IIIa Veterani Terrace	*Epipalaeo-lithic* (8200–7500 BC)	C.Turcului II Climente II Moldova Veche O.Banului I–II Padina A1–A2	*Early Meso-lithic*	Icoana I O. Banului IIIa Răzvrata I S. Cladovei I Veterani Cave Veterani Ter-race Vlasac I
***Epipalaeolithic* (c. 13.000–9500 BC)**	Băile Hercu-lane Climente II (?) C. Turcului I–II Veterani Cave(?)	*Epipalaeo-lithic*	C. Turcului II O. Banului I-II			*Epipalaeo-lithic*	Climente II C. Turcului I–II O. Banului I–IIIa Veterani Cave			*Post-Pleisto-cene*	Băile Hercu-lane C. Turcului II O. Banului II
***Final Upper Palaeolithic* (c.15.000–13.000 BC ?)**	Băile Hercu-lane Cimente I (?)	*Upper Pal-aeolithic*	C. Turcului I			*Final Upper Palaeolithic*	Climente I			*Final Pleisto-cene*	Climente II C. Turcului I O. Banului I

Tab. 2 (Continue)

end of the 8th to the second half of the 7th millennium BC. One should not exclude the possibility that the future dating might provide an even earlier date, but at present, based on the lithic industry alone, we could only suspect an Early Mesolithic date for the lowermost levels due to certain affinities of the lithic assemblage of Ostrovul Banului to finds from the lowermost levels of sector II at the site of Padina (e.g. backed pieces, circular endscrapers, etc.[27]).

Similarly, for Padina, Radovanović suspected that Epipalaeolithic traits can be recognized in the lithic industry from this site in relation to the horizon she marks Padina A1 – A2. At Padina, this industry is primarily related to concentrations of habitation activities in Sector II of this site (Fig. 11), which have not absolutely been dated so far, except for one Late Mesolithic date obtained for Burial 27 found in block 5d in the back of this sector[28] and an older, Early Mesolithic date for Burial 7 found in block 1b at Sector II (BM-1144: 8797 ± 83 BP [8200–7650 cal BC at 1 s.d.[29]; see below). Whilst at Padina the Early Mesolithic occupation has now been confirmed for a number of burials and deposits beneath much later trapezoidal building floors at Sector III[30], we still need radiometric proof that the lithic industry from Sector II is Early Mesolithic, and hence I am reluctant to attribute these deposits to the Epipalaeolithic period at present, again solely based on typological characteristics of the lithic assemblage.

In his most recent review of the Mesolithic evidence from the Danube Gorges, Bonsall[31] equates the Epipalaeolithic period with the duration of the Early Mesolithic, which according to him starts c. 13.000 BC. Yet this does not seem to be justifiable as one can recognize various elements that highlight the specificity of the Epiplaeolithic period in the Danube Gorges and make it separate from the Early Mesolithic. Apart from the already mentioned Epipalaeolithic traits in the lithic assemblages, the specificity of this period in the Danube Gorges is also mirrored in various other strands of existing archaeological evidence. Thus, the composition of the faunal assemblage from Epipalaeolithic levels I and II at Cuina Turcului differs from later typical Mesolithic faunal assemblages[32]. The most frequently hunted species in level I are suids, with a relatively high frequency of ibex and chamois in the assemblage. So-called fur-bearing animals are also present in the assemblage: with a higher frequency of beaver, wolf, marten, bear and fox. In level II there is an increase in the number of ibex specimens followed by Bos/Bison group, chamois and red deer, with a significant drop in the number of suids. Among fur-bearing animals beaver dominates, followed by wolf, hare and fox. The bream is the dominantly present fish species at Cuina Turcului. It is difficult to say whether the appearance of migratory *Acipenseridae* only in level II can have some implications for chronological changes in fishing practices with the start of the Holocene. The fact that the chamois and ibex were intensively hunted in this early phase in contrast to the red deer, which later becomes the dominantly hunted species at the early Holocene sites in the Danube Gorges, may relate as much to the environmental changes as to the change of hunting preferences.

Further, in the Epipalaeolithic levels at Cuina Turcului and Climente II a number of decorated worked osseous objects were found[33], and this tradition, with a reduced spectrum of decorative motifs, continues into the Early Mesolithic (see below). Some of the designs that consist of rectilinear geometric patterns with frequent zigzag and net motifs bear striking similarities to decorated osseous objects found at various contemporaneous Epigravettian sites across the Apennine Peninsula[34]. This may suggest that in terms of long-distance connections and supra-regional networks, the Epipalaeolithic communities in the Danube Gorges and the rest of the Balkans must have shared elements of the same cultural vocabulary with the areas farther to the west. This conclusion can further be supported on the basis of items related to body decoration, such as beads and appliqués found in levels I and II at Cuina Turcului and at Climente II. Among characteristic decorative objects are pendants from canines or incisors of wolf, boar and fox, a number of perforated red deer canines, Dentalium, *Lythgliphus naticoides*, *Lythgliphus apertus*, *Zebrina detrita*, *Theodoxus fluvialis* riverine gastropods and marine gastropods *Cyclope neritea*. Whilst perforated red deer canines as well as canines and incisors of different animals are common amongst the Palaeolithic and Mesolithic groups in Europe and various other regions, ornaments made of *Cyclope neritea* were more restricted in their distribution and are found in large numbers in contemporaneous Epigravettian burials from the Apennine Peninsula[35]. It is interesting to note that the current evidence indicates that *Cyclope neritea* appliqués re-appear only in the Late Mesolithic burials found at Vlasac and in the context of a dwelling at Ostrovul Banului (see below).

In sum, there are a number of elements that can justify separating the Epipalaeolithic in the Danube Gorges as an epoch with its own specificities in relation to later Mesolithic developments. This conclusion is at present largely based on the evidence from levels I and II at Cuina Turcului. However, one should hope that future field research in the Danube Gorges and their hinterland will succeed in finding more sites dated to the Epiplaeolithic in order to define this period with much more certainty.

27 cf. Boroneanț 2000, 71–77; pl. 36, 13–18. 38–46; Radovanović 1981.
28 Borić – Price forthcoming.
29 Borić – Miracle 2004, tab. 1 and references therein.
30 Borić – Miracle 2004.
31 Bonsall 2008.
32 Bolomey 1973, tab. 1; Nalbant 1970.
33 Mărgărit 2008; Păunescu 1970.
34 e.g. Ucelli Gnesutta – Cristiani 2002; cf. Giacobini 2006; Mussi 2002, 357 f.
35 See Mussi 2002, 355 f. fig. 7, 36–37.

Early Mesolithic (c. 9500–7400 BC)

According to currently available dates, the Early Mesolithic starts around 9500 cal BC and to date has been attested with certainty at a number of sites. Future radiometric dating may disclose deposits and features attributable to this period at other sites too. For example, it is likely that the earliest levels at Hajdučka Vodenica, Ostrovul Banului, Veterani Cave and Veterani Terrace could provide Early Mesolithic dates, but possibly some other sites too. On the basis of the existing radiometric dates, the Early Mesolithic in the Danube Gorges lasts for around two thousand years, if not longer, i.e. c. 9500–7400 BC (see Appendix 1). Such a long time span might have had internal dynamics and changes that, given the current resolution of our chronological scale, we are still not able to disentangle in order to suggest subphases for this long duration. The intensity of Late Mesolithic occupation at many sites may also have devastated Early Mesolithic deposits significantly. Such traces of Early Mesolithic dwelling at these sites are often found as patches of preserved contexts, sometimes directly stratigraphically beneath, chronologically, significantly later features at Padina, Lepenski Vir and Vlasac[36]. Such a situation may contribute to the fragmentary nature of our knowledge of the Early Mesolithic in the region, which still remains insufficiently understood if compared to the quantity and quality of data now available for the Late Mesolithic and Early/Middle Neolithic periods. However, with detailed re-analyses of numerous knapped and ground stone and osseous tool assemblages as well as faunal remains from various sites, aided by radiometric measurements from such contexts and re-analyses of stratigraphic information, one may hope to gain a higher resolution of the long Early Mesolithic duration in this region.

For instance, some indications of subphases within this period can be noticed in mortuary practices on the basis of three recently dated burials in seated lotus positions found at the sites of Lepenski Vir, Padina and Vlasac (Fig. 6). At Lepenski Vir and Vlasac only one such burial has been found per site, whereas at Padina six seated burials are known[37]. All three dated seated burials may have been contemporaneous and are confined to the later phase of the Early Mesolithic, i.e. sometime around the end of the 9th and the beginning of the

Fig. 6 Early Mesolithic seated burials with crossed legs in lotus positions: (a) Burial 69, Lepenski Vir (Srejović 1969); (b) Burials 15 and 16, Padina(Jovanović 2008, fig. 19); (c) Burial 17, Vlasac (Faculty of Philosophy, Belgrade University).

36 Borić – Miracle 2004; Borić – Dimitrijević 2009; Borić et al. 2008.

37 Borić – Miracle 2004 and references therein; Jovanović 2008, 300.

8th millennium BC. The dates have the following ranges after the correction for the aquatic reservoir effect[38]: 8170–7594 (Lepenski Vir, Burial 69, OxA-11703)[39], 8237 to 7761 (Padina, Burial 15, OxA-17145, unpublished data, see Appendix 1) and 8286 to 7749 (Vlasac, Burial 17, AA-57776)[40] all cal BC at 95 per cent confidence. Other seated burials or burials with similarly crossed legs are known from the sites of Ostrovul Corbului[41], Kula[42] and Velesnica[43], and their future dating may give similar ranges, suggesting a temporally confined burial practice.

The Epipalaeolithic decorative tradition of rectilinear designs, with a more limited repertoire of motifs than the preceding period, and with the dominance of zigzag and net patterns in particular, made on bone and stone objects, which can likely be attributed to this phase, have been found at a number of sites: Lepenski Vir, Icoana, Ostrovul Banului, Padina, Schela Cladovei and Vlasac[44]. At present, none of the decorative objects have directly or indirectly been dated. However, it is very likely that these engraved objects are of the Early Mesolithic and it remains to be seen whether any of these examples can also be dated to the Late Mesolithic period.

Boroneanț's definition of this period (see Table 2) and its chronological placement deserve more explanation here. First, one should note that Boroneanț in his most recent synthesis published in 2000, as well as in his previous works, maintains a view that diachronic developments from the Upper Palaeolithic to the appearance of the Neolithic in the Danube Gorges were continuous. After his Epipalaeolithic phase identified as ›Clisurean‹, follows the phenomenon he labels ›Schela Cladovei-Lepenski Vir culture‹, which is divided into four developmental stages. The name of this ›culture‹ to describe various phases from a number of sites on both sides of the river comes from the Romanian site of Schela Cladovei and the Serbian site of Lepenski Vir, both of which Boroneanț considers the type-sites of this particular historical development. It is easy to see that the use of the names of these two key sites, one from the Romanian and the other from the Serbian banks of the Danube reflects the research politics and a consensus to have this phenomenon represented by one of the most representative sites from each country. However, the choice of name is not only entirely arbitrary but is also misguided since the sequence at Lepenski Vir is not the best candidate to describe the typical Mesolithic development of the Danube Gorges, as will be explained later.

In the French text of Boroneanț's 2000 book as well as in its title, he uses the term Epipalaeolithic to describe not only the characteristic ›Clisurean‹ assemblage dated to the Final Pleistocene-Early Holocene (see above), but also to describe the whole development of his ›Schela Cladovei-Lepenski Vir culture‹. Yet in the English abstract to this volume, one finds the reference to the ›Mesolithic‹ in order to describe the development of the ›Schela Cladovei-Lepenski Vir culture‹. Dinu et al.[45] have noticed this confusing aspect of Boroneanț's work. Thus, it is unclear whether according to Boroneanț, this cultural phenomenon should be labeled as Epipalaeolithic or Mesolithic. It seems that his ›Schela Cladovei-Lepenski Vir culture‹ stage 1 can be related to the Early Mesolithic, which follows the Epipalaeolithic Clisurean. This author also considers the earliest stage of this new culture history formation as a move from caves and rockshelters to open-air sites. For instance, the occupation of the terrace in front of Veterani Cave, which was previously occupied in the Epipalaeolithic, coincides with the start of the ›Schela Cladovei-Lepenski Vir culture‹. Although Boroneanț's use of radiometric dates is limited in the quoted work, making it difficult to guess how can his stages be related to the absolute chronology, in Table 2, I have correlated his later stages II and III with the duration of the Late Mesolithic in the Danube Gorges, i.e. as possibly early and later phases of the Late Mesolithic. There remains a possibility that his stage II rather relates to the later part of the Early Mesolithic (c. 9500–7400 BC). If it is the case that Boroneanț's stage II falls under the Early Mesolithic time span, placing phase Schela Cladovei I into Boroneanț's stage II, as Early Mesolithic, cannot be justified since no Early Mesolithic radiometric dates are currently available from Schela Cladovei, which is primarily dated to the Late Mesolithic and Early/Middle Neolithic on the basis of a significant number of available radiometric dates[46] (see Appendix 1). Boroneanț's stage III of his ›Schela Cladovei-Lepenski Vir culture‹ can be correlated with the Late Mesolithic. He attributes the start of occupations of Lepenski Vir I–II, Padina A and Vlasac (all three on the Serbian, southern side of the river) to this stage.

38 Aquatic reservoir age phenomenon is frequently found in food webs that are dependent on marine but also freshwater sources due to the gradual deposition of ›old carbon‹ in living organisms in such ecosystems. It is signaled in stable isotope measurements by higher $\delta^{15}N$ and $\delta^{13}C$ values (see e.g. Lanting – Plicht 1998). A suggestion has been made that due to the limestone composition of geological strata in the Danube Gorges, ground and river water may have lower $^{14}C/^{12}C$ ratios than the atmosphere. In such environments, aquatic animal and plant species exhibit lower ^{14}C than terrestrial organisms (Bonsall et al. 1997, 84). Such processes affect radiocarbon measurements on samples of animal species living in marine or freshwater ecosystems, rendering the obtained radiocarbon measurements older. Consequently, humans and some other terrestrial species (e.g. otter, domesticated dogs, etc.) that are feeding substantially on organisms rich in these protein components are also affected by the reservoir effect (for stable isotope studies in the Mesolithic-Neolithic Danube Gorges see Bonsall et al. 1997; Bonsall et al. 2000; Borić et al. 2004; Borić – Miracle 2004; Grupe et al. 2003). This situation requires the correction of radiocarbon values affected by the reservoir effect prior to their calibration. Cook et al. (2002; Cook et al. 2009) suggest three methods for the correction of reservoir ages. The magnitude of correction depends on individual values of $\delta^{15}N$ and $\delta^{13}C$ and their ratios while the correction is based on the age offset between dates on human bones and those obtained on ungulate bone tools/ weapons found in association with burials, with a good probability of being contemporaneous with those burials. In particular, good examples of reliable associations used for the calculation of age offset are bone points embedded in several skeletons found at Schela Cladovei (see below). For the correction method used here see Appendix 1. It should be noted that dates corrected for the freshwater reservoir effect have a large magnitude of error and produce larger standard deviations than non-corrected dates.

39 Bonsall et al. 2004; Bonsall et al. 2008.

40 Borić et al. 2008.

41 Păunescu 1996; cf. Boroneanț 2010.

42 Sladić 2007; Mikić – Sladić 1994.

43 Vasić 2008.

44 e.g. Borić 1999; Boroneanț 2000; Radovanović 1996; Srejović – Babović 1983; Srejović – Letica 1978.

45 Dinu et al. 2007, 44.

46 Bonsall 2008; Dinu et al. 2007.

However, new radiometric evidence from these three sites clearly shows that the start of their occupation can now be put to the Early Mesolithic period[47].

In Dragoslav Srejović's[48] chronological scheme, Icoana I, Padina A, Proto-Lepenski Vir and Vlasac Ia were dated correctly to the Early Mesolithic time span. Both in Srejović's scheme and in that proposed by Voytek and Tringham[49], Schela Cladovei I is correlated to the Early Mesolithic and, as previously noted, whilst future radiometric evidence could confirm this suggestion of an Early Mesolithic date for Schela Cladovei, at present, the occupation of this site remains confined to the Late Mesolithic and Early/Middle Neolithic (see below). Voytek and Tringham, on the other hand, do not date Padina A to the Early but to the Late Mesolithic, regardless of the fact that, at the time of writing of their contribution, several dates made in the British Museum laboratory had already indicated the existence of the Early Mesolithic horizon at this site[50].

At Padina, new radiometric evidence suggests both Early and Late Mesolithic occupation spans relating to phase Padina A, which the excavator, Jovanović[51] initially proposed and dated to the Mesolithic. I suggest splitting this phase into two labels, and in Table 2 Padina A(I) is chosen as a new label for the Early Mesolithic and Padina A(II) for the Late Mesolithic occupation traces and time spans at this site. One should note that the definition of these new labels for the Early and Late Mesolithic phases at Padina is completely different from Radovanović's use of label ›Padina A1–A2‹, which she coined in order to designate an Epipalaeolithic phase at Padina, deduced on the basis of her analyses of the knapped stone industry found at Padina's Sector II[52]. As already mentioned, there has been no radiometric evidence from the layers associated with this lithic tool assemblage from Sector II, and Radovanović's suggestion of the Epipalaeolithic date for this part of the site and the assemblage remains uncertain and unproven at present.

Problems also arise when trying to correlate the Early Mesolithic as defined in this paper and the stages of Mesolithic development in the Danube Gorges suggested by Radovanović[53]. For Radovanović[54], the start of the Mesolithic sequence in the Danube Gorges dates to the second half of the 8th millennium cal BC. However, such dating does not correspond with our current understanding of the duration of particular periods and phases in this region. Whilst a number of Early Mesolithic dates for the occupation of the Danube Gorges appeared only after the publication of Radovanović's synthesis, similar to Voytek and Tringham, Radovanović chose to ignore Early Mesolithic dates from Padina available at the time of her writing[55]. Furthermore, in her synthesis of the Mesolithic of the Danube Gorges, the Epipalaeolithic period and in particular the absolutely dated Epipalaeolithic occupation at Cuina Turcului (see above), with the same period also assumed at other sites, such as Veterani Terrace, Padina A1–A2 and Ostrovul Banului I–II, is given the time span of 8200–7500 BC[56]. It remains unclear why Radovanović attributed this chronological range to the Epipaleolithic in spite of the existence of much earlier radiometric measurements available for Cuina Turcului I–II. In her more recent article, Radovanović[57] accepts the reality of the Early Mesolithic period in the region and fully adopts the newly available radiometric evidence, somewhat correcting her own phasing of Lepenski Vir. However, to date, Radovanović has not updated or corrected the periodization provided in her 1996 book, which is used as the seminal text for the study of the region. Hence, it was important to spell out necessary corrections to the proposed chronological periods/phases suggested by Radovanović in order to avoid future use of this now out-dated periodization.

Late Mesolithic (c. 7400–6300/6200 BC)

The Late Mesolithic in the Danube Gorges is the iconic period of the whole Mesolithic development in this region, and judging by the number of available radiometric dates, which peak for this time span (Fig. 5), the intensity of occupation is very high at a number of sites. Let's start the discussion of this period by examining how its current understanding corresponds with previously suggested periodisations.

Radovanović's phases 1 to 4, on the basis of her definition of these phases and offered chronological brackets, can be related to the Late Mesolithic in the Danube Gorges (Table 2). Although Radovanović[58] dates her phase 1 into the second half of the 8th millennium cal BC, i.e. to the early phase of what we now understand as the Late Mesolithic, it is more appropriate for this phase to be related to the Early Mesolithic on the basis of certain material culture characteristics singled out by Radovanović herself. But, even by moving her phase 1 to the Early Mesolithic time span, another three phases (2 to 4) remain within the duration of just over a millennium long Late Mesolithic, and it is open to questioning whether these phases, which Radovanović correlates with stratigraphic horizons from a number of different sites, actually reflect any real patterns of diachronic changes. Her phasing of the whole Mesolithic time span is based on the supposed diachronic development of hearth forms as seen in the stratification of hearths at Ostrovul Corbului, considered representative of the region[59]. However, these hearths have not been dated and it is doubtful if they can be taken as representative chronological markers. At present, Radovanović's division of the period remains unproven and any finer chronological resolution of the Late Mesolithic development will be dependent on further programmatic dating of well-defined contexts with chronologically ›diagnostic‹ elements

47 Borić – Miracle 2004; Borić – Dimitrijević 2009; Borić et al. 2008.
48 Srejović 1988; Srejović 1989.
49 Voytek – Tringham 1989.
50 Burleigh – Živanović 1980; Borić – Miracle 2004.
51 Jovanović 1969.
52 Radovanović 1981; also Jovanović 2008, 297–300.
53 Radovanović 1996.
54 Radovanović 1996, 286.
55 See Radovanović 1996, Appendix 3.
56 Radovanović 1996, 252. 285.
57 Radovanović 2006.
58 Radovanović 1996, 286.
59 For Ostrovul Corbului, see Mogoşanu 1978a; Păunescu 1996 and cf. Dinu et al. 2007, 42 f.

of the material culture. Furthermore, for Radovanović, the development of architectural elements at Lepenski Vir, notably rectangular stone-lined hearths and trapezoidal buildings, can be followed from her phase 2, which she relates to Proto-Lepenski Vir hearths and their occupation, through phases 3 to 5, which respectively relate to her own rephrasing of trapezoidal buildings of Lepenski Vir to LV I(1), I(2) and I(3). However, as already explained, on the basis of a substantial number of available radiometric dates from Lepenski Vir[60], I suggest that the phase which Srejović named Proto-Lepenski Vir, and which was attributed to rectangular stone-lined hearths found underneath or in the vicinity of later trapezoidal buildings and also represented by at least two absolutely dated burials, is Early Mesolithic and appears discontinuous from the later occupation of trapezoidal buildings. The construction of trapezoidal buildings at Lepenski Vir starts only around 6300/6200 cal BC (see below).

Such dating of Proto-Lepenski Vir is shown by two recent radiometric dates from Hearth a, which was found next to a sequence of several partly overlapped trapezoidal buildings (Fig. 7). On the photograph showing this hearth one can clearly recognize a dark oval surface around the hearth that seems to indicate the existence of an occupation zone. This zone was also associated with a concentration of animal bones left behind after the abandonment of this feature. There are two recent AMS dates associated with this hearth[61]. One is made on an animal bone from the concentration left next to the hearth, whilst the other date comes from an isolated human mandible, Burial 22, found beside the hearth. The first date indicates that the use of the hearth might have been connected to the period 7740–7587 cal BC at 95 per cent confidence (OxA-16074). The second date, made on the human mandible, after the correction for the freshwater reservoir effect, falls in the range 7580–7190 cal BC at 95 per cent confidence (AA-57781). We may speculate that the latter date, for the human mandible, suggests that it might have been deposited in association with this occupation at the time of its abandonment. The dates obtained for this feature would put the dating of this type of rectangular stone-lined hearths into the late phase of the Early Mesolithic in this region, i.e. the later period of the Proto-Lepenski Vir phase at the type-site[62].

Fig. 7 Late phase of the Early Mesolithic occupation around Hearth a, Proto-Lepenski Vir (Faculty of Philosophy, Belgrade University).

On the other hand, a representative series of both charcoal and AMS dates obtained now for a number of trapezoidal buildings belonging to phase Lepenski Vir I–II suggest that this construction boom at Lepenski Vir lasted for only two or three centuries at most, i.e. c. 6200/6300–5900/5950 cal BC[63] (see below). This temporal compression of the most recognizable phase at Lepenski Vir is one of the most significant changes in relation to most of the previous chronological schemes. Whereas previously the Late Mesolithic was seen as the period of the flourishing of Lepenski Vir with the construction of trapezoidal buildings and the appearance of sculpted boulder artworks characteristic of the site and associated with these structures[64], at present, out of 104 dates currently available for Lepenski Vir (37 on human, 33 on animal and 20 on charcoal samples, Table 1) not a single date falls into the span of the Late Mesolithic, i.e. into the period 7400/7300 to 6300 cal BC[65]. Such a dating reveals a gap of at least 900 years, and possibly longer between the dating of Proto-Lepenski Vir phase and the first trapezoidal buildings, i.e. the transformational phase. While the newly available dates make such a chronological placement of trapezoidal buildings apparent beyond any reasonable doubt, this new chronological placement of phase I–II at Lepenski Vir could have already been deduced on the basis of the early series of charcoal dates, which all related to trapezoidal buildings, i.e. were made on the remains of the upper wooden construction of these buildings[66]. Yet this series of dates was ignored by Srejović and, subsequently, those authors who relied on Srejović's dating of Lepenski Vir I–II (e.g. see Table 2). One should note that it is possible that building activity at Lepenski Vir during phase I–II or activity related to Neolithic phase III at this site might have significantly devastated Late Mesolithic deposits, and that this is one of the reasons why we lack traces of Late Mesolithic occupation at this site. Further, we should leave the possibility open that the future radiometric dating of either occupation residues from various contexts at Lepenski Vir or remaining undated burials may alter our current view of the diachronic dynamics in the occupation of this site. Yet, at face value, the large number of

60 Bonsall et al. 2008; Borić – Dimitrijević 2007; Borić – Dimitrijević 2009; Borić et al. forthcoming.
61 Borić – Dimitrijević 2009; Borić – Price forthcoming.
62 Borić – Dimitrijević 2007; Borić – Dimitrijević 2009.
63 Borić et al. forthcoming.
64 e.g. Borić 2005; Srejović – Babović 1983.
65 AA-57781 gives the range 7580–7190 cal BC at 95 per cent confidence that dates Burial 22 found in association with stone-lined rectangular Hearth a (Fig. 7). While this date can be considered the youngest date for the Early Mesolithic occupation related to phase Proto-Lepenski Vir, the range given at two standard deviations partly overlaps with the possible start of the Late Mesolithic. However, this date has a larger standard deviation than usual due to the correction for the aquatic reservoir effect (see footnote 38) and hence it does not affect the striking pattern with regard to the lack of radiometric measurements for the Late Mesolithic occupation of Lepenski Vir.
66 Quitta 1975; Borić 1999; Borić 2002b, Appendix 1.

dates from different contexts and various burials, which thus far have not given Late Mesolithic dates, as well as the stratigraphic superposing of Early Mesolithic occupation residues and trapezoidal buildings, strongly point to the conclusion that Lepenski Vir was not occupied in the course of the regional Late Mesolithic. However, it seems that the first forms of trapezoidal buildings appeared in the Late Mesolithic.

Whilst the construction of trapezoidal buildings with limestone floors and central rectangular stone-lined hearths at Lepenski Vir started only after 6300/6200 cal BC, the new dates from the site of Vlasac suggest that the first ›experimental‹ attempts with this architectural form started as early as the beginning of the 7th millennium BC[67] but most likely faded away in the course of the 7th millennium before being revived again at Lepenski Vir[68]. At Vlasac, during the 1970–1971 excavations, dwelling structures were found with approximately trapezoid-shaped bases dug into the slope of the river terrace. Split stones bordered these floor areas, and rectangular stone-lined hearths were found in the centre of these features (see below about very similar constructional elements of later Lepenski Vir structures). In these five instances where one finds floored areas, the leveled occupation area was furnished by a red limestone covering mixed with sand[69]. The new AMS dates on animal bone samples found on the floors of four out of five dwelling features, along with one previous charcoal sample from the floor of Dwelling 4, suggest the following overlapping ranges, all expressed as cal BC at 95 per cent confidence: 7163–6818 (OxA-16214, Dwelling 1[70]), 7042–6699 (OxA-16215, Dwelling 1), 7047–6699 (OxA-16216, Dwelling 2), 7028–6651 (OxA-16218, Dwelling 3), 7036–6496 (Bln-1170, Dwelling 4[71]) and 7026–6750 (OxA-16543, Dwelling 5). Keeping in mind the practice of making red plastered floors in the Levant and Anatolia during the PPNB (c. 8550–6750 BC) and PPNC (c. 6750–6300 BC) periods, one should not exclude the possibility that the examples of elaborated floor areas of dwelling features at Vlasac with red limestone might have been in some way influenced by the practices common in the wider eastern Mediterranean during an earlier or contemporary period[72]. It could be hypothesized that long-distance connections were established with various areas to the east, such as western Anatolia and beyond, in the course of the Late Mesolithic in the Danube Gorges. In fact, the Danube might have been one of the important natural corridors as well as the Black Sea coast farther to the southeast. The indirect proof of such possible connections are *Cyclope neritea* appliqués, also dated to this period (see below, Fig. 9). The habitat of these marine gastropods is deltas of big rivers to the sea, and those found in the Danube Gorges might have come from the Black Sea and the Danube delta. If the presence of marine gastropods in the Danube Gorges is taken as a strong indication of long-distance connections, we could assume that certain cultural practices might have made their way to this region from far-away places. The Danube Gorges region was perhaps a peripheral part of a much larger Neolithic eastern Mediterranean ›culture area‹ or ›interaction sphere‹ in the course of the 7th millennium BC. The later, more elaborate examples of mud plaster reddish floors at Lepenski Vir might have been a later revival of the practice of plastering floors around hearths, which was triggered by another major period of contact between the Danube Gorges foragers and the Early Neolithic communities.

At Vlasac, in many instances one finds stone-lined rectangular hearths without any furnishing of the floor area, which are now absolutely dated either in the period that is contemporaneous with (e.g. Hearth 23 dated by OxA-16221 in the range 7033–6686 cal BC at 95 per cent confidence) or follows (e.g. layer between Hearths 20 and 16 dated by OxA-16080 and -16220 in the range 6638–6479 and by Bln-1168 in the range 6592–6236 cal BC at 95 per cent confidence) the period during which the first recognizable traces of trapezoidal dwellings appeared. Most of the features at Vlasac are related to the Late Mesolithic phase, and there seems to have been an increase in the use of this place as a burial ground (a cemetery?) in the later phases of the Late Mesolithic. But one should remember that people were buried at this site throughout its Mesolithic phases as well as in the Transformation/Early Neolithic phase (see below).

Current dating evidence suggests that the site of Schela Cladovei was intensively occupied primarily during the Late Mesolithic with no Early Mesolithic date so far coming from this site (see above). The intensity of occupation at Schela Cladovei during the Late Mesolithic, the number of burials as well as patterns of their clustering[73] are comparable to the site of Vlasac, regardless of the fact that the two sites are quite apart from each other (almost 70 km along the Danube). In addition, traces of violence have been documented at both Schela Cladovei and Vlasac[74] and are all dated to this period[75]. Chiefly, these instances of violence might have been

67 Borić et al. 2008; cf. Borić 2007a.

68 Borić 2007a; Borić 2010.

69 Srejović – Letica 1978; Borić 2007a; cf. Borić et al. 2008.

70 Several old charcoal dates, which supposedly came from Dwelling 1, give ranges 6032–5720 (Z-262), 5988–5642 (Bln-1051) and 5893–5522 (Bln-1051a) respectively, all cal BC at 95 per cent confidence. However, these dates cannot be taken as representative for the construction/ occupation/ abandonment of these features. It is most likely that these dates represent later intrusions. The same applies to two old charcoal dates from Dwelling 2: Bln-1053 and Bln-1041 that gave respective ranges 5983–5618 and 5966–5534 cal BC at 95 per cent confidence (Borić et al. 2008). The explanation for such unexpectedly younger dates could be that possibly older, Middle Neolithic wooden posts, or Neolithic digging in the zones of previous dwellings, might have brought chronologically younger remains in association with the floors of these Late Mesolithic dwelling features.

71 OxA-16219 dated a red deer antler from the floor of Dwelling 4 and the obtained range is 9756–9321 cal BC at 95 per cent confidence. This surprisingly early date suggests that the dated antler must represent residual material of the older, Early Mesolithic occupation of Vlasac. The antler specimen might have been found in the layer into which Dwelling 4 was dug in or, more likely, it ended up lying over the floor of this building in the event of backfilling the semi-subterranean area of the dwelling using the soil that contained remains of older Early Mesolithic occupation (for similar instances from Lepenski Vir, see Borić – Dimitrijević 2009). It is improbable to see this red deer antler specimen as being a curated tool, which the Late Mesolithic community at Vlasac would have inherited from its Early Mesolithic forebears.

72 Borić 2007a; on the appearance of terrazzo floor buildings in western Anatolia see also Çilingiroğlu, this volume.

73 See Boroneanț – Boroneanț 2009; Boroneanț et al. 1999.

74 Boroneanț 1990; Boroneanț – Nicolăescu-Plopșor 1990; Boroneanț et al. 1999; Roksandic 2004; Roksandic et al. 2006.

75 See Bonsall 2008; Cook et al. 2002, tab. 2–3.

caused through intra-regional feuding if judging by the types of weapons used: bone points that might have been used as arrowheads. There are five dates made on skeletons from Schela Cladovei (two from 1967 and three from 1991–1996 excavations at the site) that had bone points[76] either embedded in a skeletal element or found in association with a skeleton, possibly indicating violent deaths. The following ranges are available for these skeletons: 7072–6665 (OxA-8502), 7051–6532 (OxA-8547), 7060–6573 (OxA-8581), 7126–6601 (OxA-8583) and 7002–6464 (OxA-8548), all cal BC expressed at 95 per cent of confidence after correction for the aquatic reservoir effect. These overlapping ranges put such instances from Schela Cladovei into the last century of the 8th and the first half of the 7th millennium BC. Burial 4 from Vlasac had a similar bone point embedded in the left coxal of this individual (Fig. 8)[77]. Although it has not yet been dated directly, we may assume a similar date for this instance of violent death to those reported from Schela Cladovei. Taking all this into account, if one wanted to select representative type-sites for the characteristics of the Mesolithic existence in the Danube Gorges, instead of the culture history label ›Schela Cladovei-Lepenski Vir culture‹, which is still widely used by many Romanian archaeologists who follow Boroneanț's terminology (see above), one would more accurately describe typical cultural elements characteristic of the (Late) Mesolithic in the region by a hyphenated label ›Schela Cladovei-Vlasac‹ type of sites[78].

The similarities between Schela Cladovei and Vlasac also extend to the type of body decoration found in burials. Appliqués made of carp (Cyprinidae family) pharyngeal ›teeth‹ were found in burials at both sites[79], most likely being sewn on the clothes of the deceased. Some of these appliqués had cuts made on the root for easier fastening, as shown by use-wear patterns[80]. At Vlasac, ornaments in burials included the following combinations: (a) only numerous appliqués of Cyprinidae teeth (Burials 14, 42a – b, 45a, 46, 47, 48, 50a, 60, 62, 78a from 1970–1971 excavations and Burial H267 from 2006–2009 excavations); (b) numerous appliqués of Cyprinidae teeth in combination with a smaller number of *Cyclope neritea* marine gastropods (Burials 21, 29, 31, 74 from 1970–1971 excavations and Burials H2 and H297 [Fig. 9] from 2006–2009 excavations); and (c) appliqués of Cyprinidae teeth in combination with a smaller number of *Columbella rustica* marine gastropods (Burial 49). These ornaments were primarily accompanying females, but also some children and male individuals. Out of 11 individuals that were found with Cyprinidae teeth appliqués only, five were women (Burials 14, 46, 47, 48 and H267), two possible males (Burials 50a and 78a), one male (Burial 60) and three children (Burials 42a – b and 62). From six burials that had the combination of Cyprinidae teeth and *Cyclope neritea* marine gastropods, two were women (Burials 29 and H2), one possible woman (Burial 74), two children (Burials 21 and H297) and only one man (Burial 31), while an adult female (Burial 49) had the combination of Cyprinidae appliqués with *Columbella rustica*[81]. On the basis

Fig. 8 Bone projectile point embedded in the left coxal of Burial 4a, Vlasac.

Fig. 9 Appliqués made of Cyprinidae pharyngeal teeth (perforated) and *Cyclope neritea* marine gastropods found *in situ* in child Burial H297 at Vlasac (photo: D. Borić).

76 These bone points were directly dated and the dates provide important information for the correction of the aquatic reservoir effect (see Cook et al. 2002; Cook et al. 2009). For more details see footnote 38.
77 Roksandić et al. 2006.
78 see also Bonsall 2008, 255.
79 Boroneanț 1990; Srejović – Letica 1978.
80 E. Cristiani, pers. comm.
81 Borić 2002a, Appendix 4 and references therein; unpublished data.

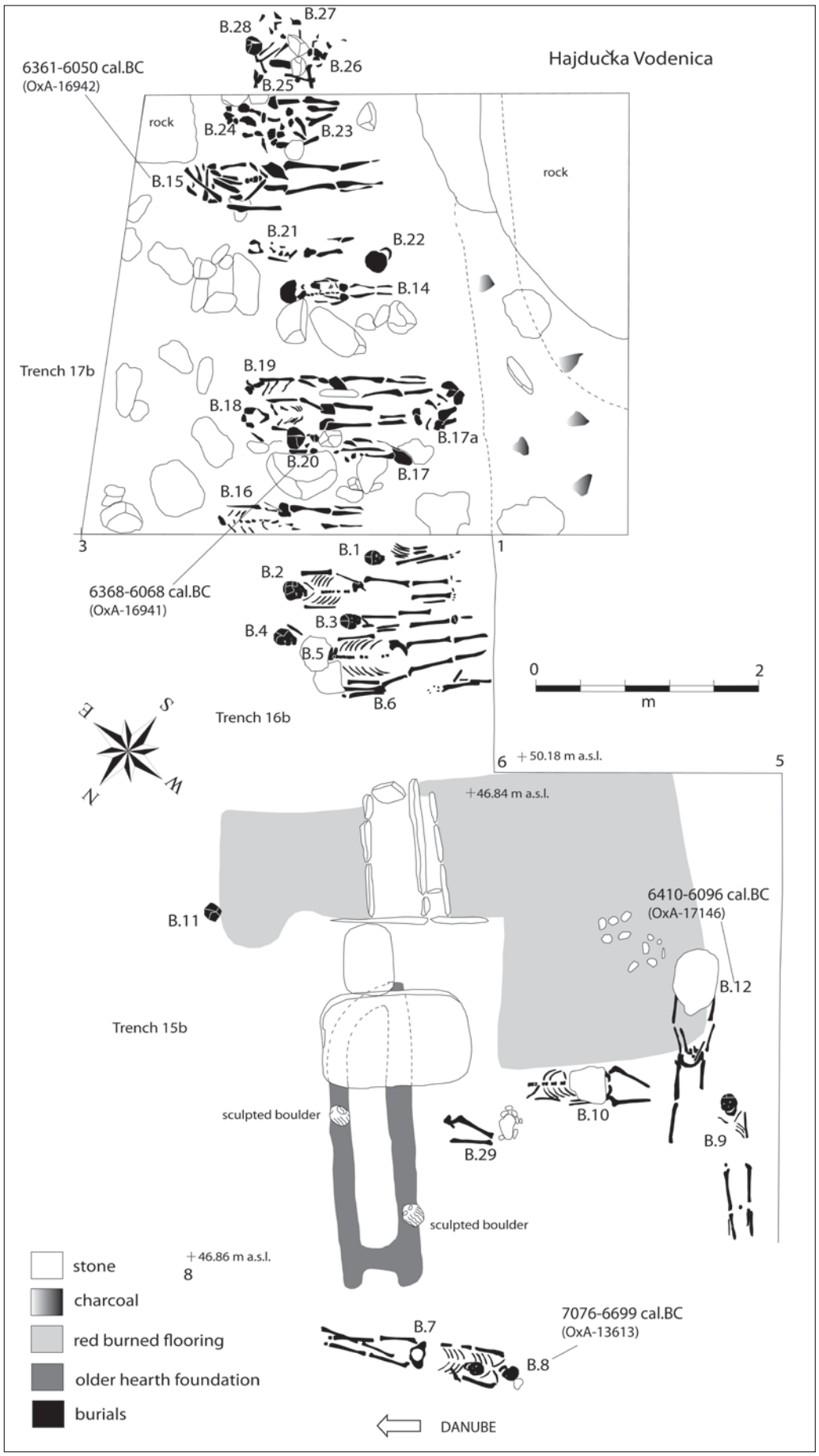

Fig. 10 Excavated areas and features at Hajdučka Vodenica in Trenches 15b, 16b and 17b (adopted after Borić – Miracle 2004, fig. 11; plan courtesy B. Jovanović).

of three available radiometric dates for the burials adorned by ornaments, the use of this type of body decoration at Vlasac can be dated to the mid-7th millennium cal BC. Three dated burials gave the following ranges: 6823–6436 (AA-57777, Burial 31), 6775–6470 (OxA-16541, Burial H2) and 6654–6411 (AA-57778, Burial 45), all cal BC at 95 per cent confidence (see Appendix 1). It is interesting to note that these combinations of ornaments appear in the Danube Gorges only in the 7th millennium BC. After their appearance in the Epipalaeolithic levels at Cuina Turcului (see above), *Cyclope neritea* reappeared only in the Late Mesolithic. At present, no ornaments can securely be dated to the Early Mesolithic of the region. An undated context at Ostrovul Banului contained a group of at least 20 pieces of *Cyclope neritea*[82]. On the basis of the current dating evidence from this site (see above), this instance could also be dated to the Late Mesolithic.

The use of Hajdučka Vodenica (Fig. 10) has primarily been associated with the duration of the Late Mesolithic, which was also confirmed on the basis of the first radiometric dates dating human burials from this site[83]. However, due to reported problems with the ultrafiltration protocol used by the Oxford Radiocarbon Accelerator Unit (ORAU) in relation to a series of dates of which the first AMS dates from Hajdučka Vodenica were part[84], the samples were remeasured and the obtained values suggest that the three dated burials (12, 15-›younger‹ and 20) found in association with a rectangular hearth construction previously assigned to the end of the Late Mesolithic, should now be dated to the Transformation/Early Neolithic phase (see below). The Late Mesolithic date is confirmed for Burial 8 found in front of this later hearth construction, closer to the Danube and at a lower level than the rest of the burials. Burial 7 was placed directly on top of Burial 8. Burial 8 is remeasured to the range 7076–6699 cal BC at 95 per cent confidence (OxA-13613, see Appendix 1). Interestingly, these Late Mesolithic Burials 7 and 8, whilst placed in extended supine positions parallel to the Danube, were oriented with their heads pointing in the upstream direction, completely opposite from the dominant norm of orienting burials with their heads in the downstream direction, seen at this and other Late Mesolithic sites in the region. At approximately the same level as Burial 8, and closer to the hearth construction, at the level of the foundation trenches of an earlier hearth construction at this place, another Late Mesolithic burial has now been dated directly – Burial 29, giving the range 6680–6434 cal BC at 95 per cent confidence (AA-57774[85]). This handful of dates from Hajdučka Vodenica now indicates the continuity of occupation, i.e. the use of this area of the site as a burial ground, throughout the Late Mesolithic and likely continuously into the Transformation/Early Neolithic phase. The Late Mesolithic date can also be assumed for the southwestern area of the site, where one finds several levels of overlapped stone constructions and several rectangular hearths. There are no radiometric measurements from this part of the site. In addition, by analogy with similar stone constructions at the site of Padina, at least the lowermost levels here might disclose an Early Mesolithic date.

With regard to the site of Padina, in their chronological schemes, both Srejović and Radovanović suggest placing phase Padina B(1) or B(I) in the Late Mesolithic, i.e., according to Radovanović's regional chronological scheme, to phase 4, which she dated to the period c. 6500–6300 BC. Phase Padina B, as defined by the excavator of the site of Padina, B. Jovanović[86], relates to the Early Neolithic occupation of this site, whilst the subphases B1–3 correspond with the three identified rows of trapezoidal buildings: from the oldest to the youngest as one moves from the Danube up slope. More recently, Jovanović identifies phase Padina A–B or »contact period«[87] that can be synchronized with what I label as the Transformation/Early Neolithic period in the Danube Gorges (see below). New radiometric evidence has confirmed Jovanović's dating of Padina B features, notably trapezoidal dwellings, which can in most of their constructional elements be compared to trapezoidal buildings from Lepenski Vir, found only five kilometers downstream the Danube from Padina. The justification for the identification of phases Padina A–B and Padina B will be discussed in more detail in the following section, which deals with the Transformation/Early Neolithic regional phase. As previously mentioned, when discussing the Early Mesolithic evidence from this site, the label Padina A(II) is here suggested in order to characterize the Late Mesolithic development at this site. Traces of the Late Mesolithic are now dated at all three sectors of this site. At sector I (Fig. 11), Burial 1a and an antler tool found in this burial were dated to the mid-7th millennium cal BC[88]. Apart from this recently dated burial, at the same sector, one finds three extended supine inhumations parallel to the Danube

82 Boroneanţ 2000, 194.

83 Borić – Miracle 2004.

84 A number of dates from Padina, Hajdučka Vodenica and Lepenski Vir (see Appendix 1 for details), were affected by the ultra filtration problem in the Oxford Radiocarbon Accelerator Unit (ORAU). Dates within the following series were reported as affected by the ORAU: OxA-9361 to -11851 and -12214 to -12236. The results of new measurements made on the same samples from Padina and Hajdučka Vodenica were, depending on the measurement, from 43 to 335 radiocarbon years (with the mean value of 198 years for nine instances related to the two sites) younger than the first measurements made on the same samples. These new measurements, which replace a number of previously published dates from these sites, are here published for the first time (see Appendix 1).

85 Borić – Price forthcoming.

86 Jovanović 1969; Jovanović 1987.

87 Jovanović 2008.

88 OxA-16940 dates the antler tool associated with Burial 1a in the range 6633–6464 cal BC at 95 per cent confidence. This date replaces previously published OxA-11107 (Borić – Miracle 2004) and the sample was remeasured due to the ultrafiltration problem reported by the Oxford laboratory for a series of dates of which this date was part (see footnote 84). At present, there is no new direct measurement for Burial 1a since a repeated attempt at measuring this skeleton in the ORAU (lab. no. P21263) failed due to low collage yield (T. Higham, letter dated January 23rd, 2007). In addition, in relation to Burial 1a, it should be mentioned that, recently, the excavator of Padina, B. Jovanović (2008, 304), noted that the caption on the photo of this burial published by Živanović (1973/1974, tab. 1, 1) is wrong and that the photo actually shows extended supine inhumation Burial 2 at Padina's Sector I. Jovanović notes that Burial 1a was very poorly preserved with only lower extremities found in articulation but with a strong indication of an extended supine position. Borić – Miracle (2004, fig. 4) when reproducing the photo of Burial 2 from Živanović's publication repeated this error and assigned it wrongly to Burial 1a.

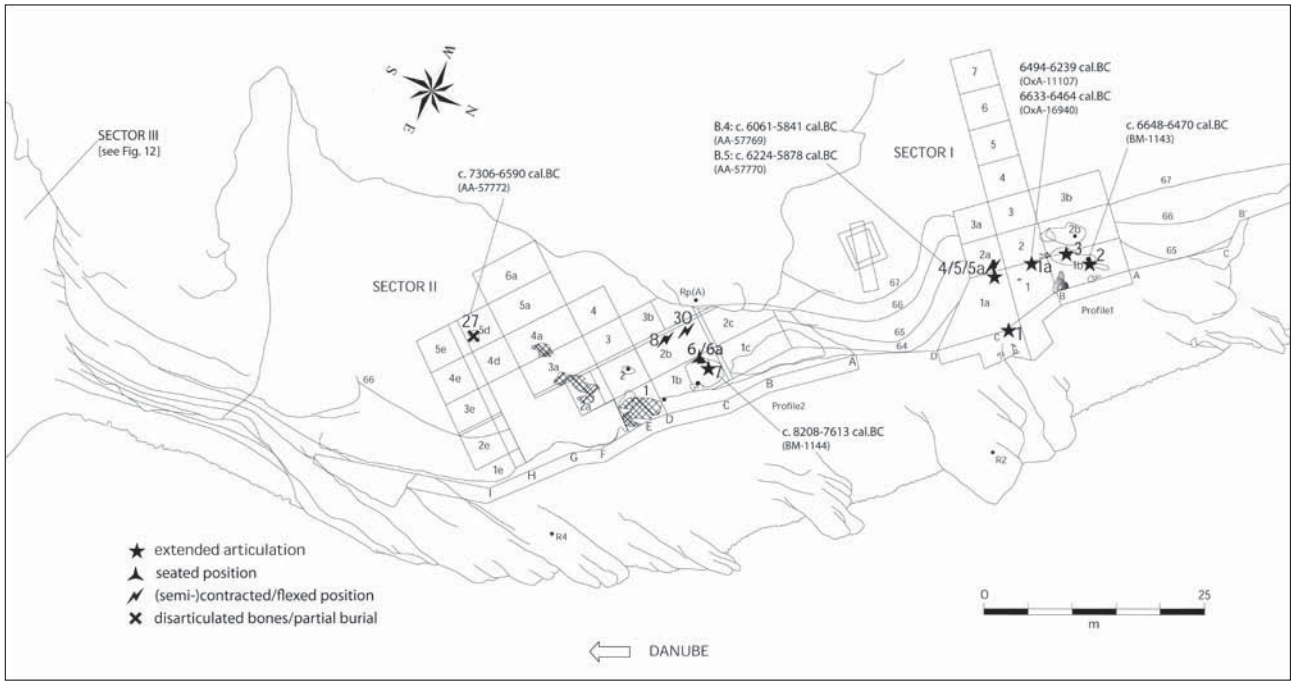

Fig. 11 Excavated areas and features at Sectors I – II, Padina (adopted after Borić – Miracle 2004, fig. 2; plan courtesy B. Jovanović).

and with their heads pointing in the downstream direction (Burials 1, 2 and 3). Burial 2 was dated in the laboratory of the British Museum giving a Late Mesolithic date with the range falling in the mid-7th millennium cal BC. However, as noted by Bonsall[89], these older series of BM-dates[90] are of limited use as there is no published information about the $\delta^{13}C$ and $\delta^{15}N$ values, and, considering the problem of the aquatic reservoir effect in the Danube Gorges in relation to most of the burials[91], one should reasonably expect that the results obtained for burials dated by the British Museum were also affected by the reservoir effect requiring the correction of the reported values. The best strategy for the future would be to date these skeletons again, but at present there seems to exist a good correspondence between these results, the pattern of mortuary behavior they exhibit and the new AMS dates obtained for similar burials that cluster in the same areas both in relation to the Early Mesolithic (see above) as well as the Late Mesolithic use of the site for the disposal of the dead. Hence, in the case of dated burials from Padina, the British Museum dates can broadly be considered accurate.

The burial position and orientation described (extended supine inhumations parallel to the Danube with their heads pointing downstream) became an established norm in the mortuary behavior of various sites in the Danube Gorges during the Late Mesolithic, and was in particular the dominant orientation in the course of the succeeding phase at the site of Lepenski Vir[92]. Yet there are significant variations from this norm during the Late Mesolithic at various sites[93]. As previously mentioned when discussing the existing evidence for the Epipalaeolithic-Early Mesolithic occupation at Padina, at Sector II (Fig. 11), radiometric dates on two burials (7 and 27) indicate both Early Mesolithic and Late Mesolithic use of this sector of the site (see above). Burial 27 found in block 5d, at the periphery of the river terrace of this sector, represents a secondary interment of a human skull that was encircled and covered by stone plaques and split stones whilst traces of burning were found in the vicinity of this burial in the diameter of 1.2 m[94]. After the correction for the freshwater reservoir effect, the burial is dated in the range 7306–6590 cal BC at 95 per cent of confidence (AA-57772[95]). The excavator of the site dates this burial to the so-called contact phase A – B[96]. However, the radiometric date indicates a Late Mesolithic time span.

Finally, at Padina's Sector III (Fig. 12), Late Mesolithic remains were picked up primarily on the basis of new radiometric dates as residual traces. A red deer mandible found in the space between dwelling remains marked as Buildings 5 and 6, was dated in the range 7600–7340 cal BC at 95 per cent of confidence (OxA-9055[97]). Another date comes from the soil that was covering the floor of trapezoidal building 12 and dates a dog tibia in the range 6735–6456 cal BC at 95 per cent confidence (OxA-9034[98]). It seems that here one encounters residual remains associated with features that are of later date (see below about the dating evidence that puts trapezoidal buildings at Padina and Lepenski Vir in the Transformation/Early Neolithic period). The association of this dog tibia with the floor of building 12 can be explained by the re-deposition of the soil containing older remains over the floor of building 12 upon its abandonment/back-filling.

89 Bonsall 2008, tab. 10, 4.
90 Burleigh – Živanović 1980.
91 See footnote 38.
92 cf. Radovanović 1996, 222. 224.
93 Borić – Miracle 2004, 360; cf. Borić 2010.
94 Jovanović 1969; Jovanović 2008, fig. 15.
95 Borić – Price forthcoming.
96 Jovanović 2008, 298.
97 Borić – Miracle 2004 and references therein.
98 Borić – Miracle 2004 and references therein.

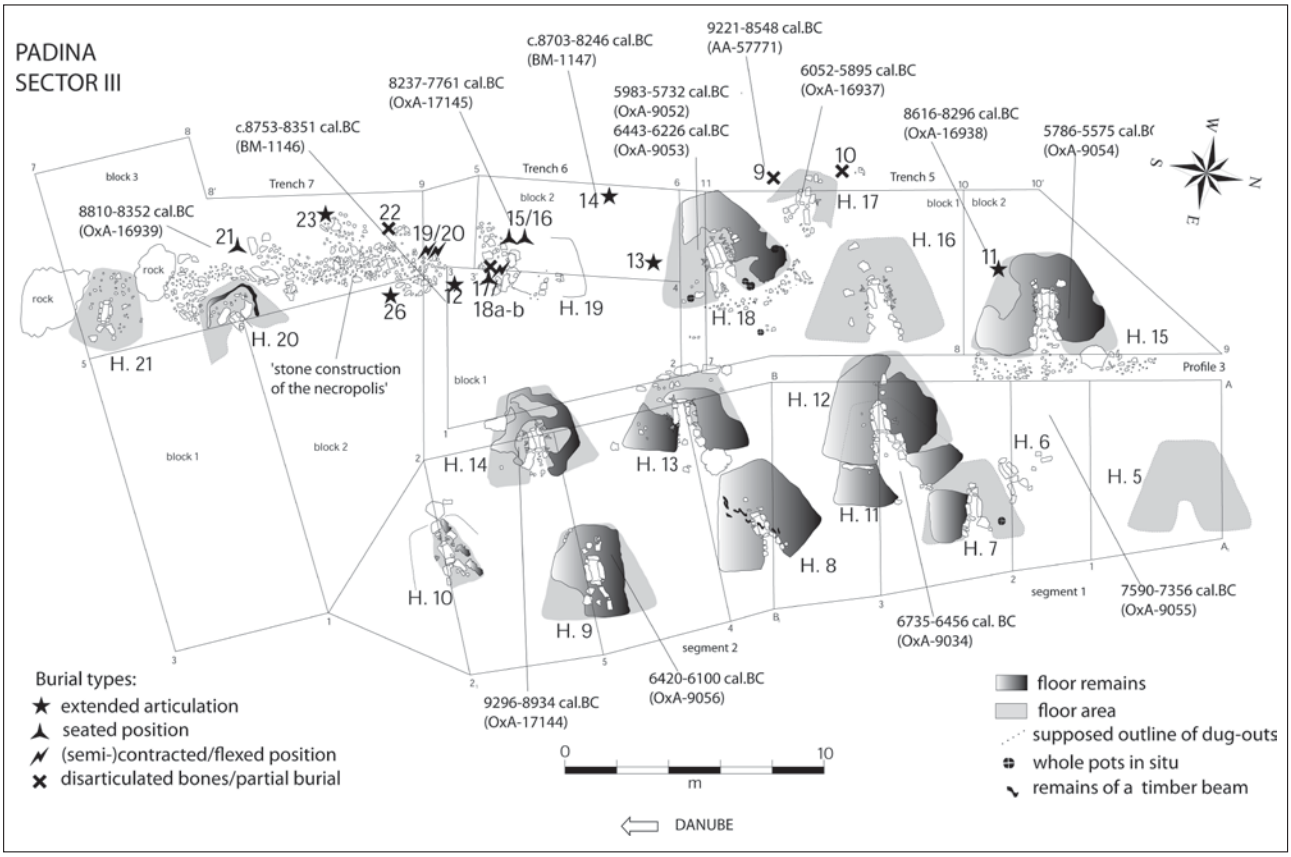

Fig. 12 Excavated areas and features at Sector III, Padina (adopted after Borić – Miracle 2004, fig. 3; plan courtesy B. Jovanović).

A similar explanation was offered with regard to radiometric outliers when dating several unmodified animal bones from the floors of some trapezoidal buildings from Lepenski Vir in relation to residual remains that gave Early Mesolithic dates[99]. Finally, OxA-9053, which dates a dog ulna found underneath the floor of trapezoidal building 18, after the minimal correction for the aquatic reservoir effect (see footnote 38 and Appendix 1) gives the range 6440–6210 cal BC at 95 per cent confidence[100], further indicating the existence of Late Mesolithic traces at this place. Hence, whilst at Padina's Sector III one finds more substantial remains of Early Mesolithic burials with associated stone constructions (see above), and especially a well preserved settlement dating to the Transformation/Early Neolithic period with developed forms of trapezoidal buildings, scarce remains of Late Mesolithic occupation were preserved only in traces at this part of the site and are attested only by dating residual faunal remains in the two instances mentioned.

Transformation/Early Neolithic (c. 6300/6200–5900/5950 BC)

The duration of the Transformation/Early Neolithic period, as identified here, is the shortest one among all of the other periods discussed herein. Yet most of the controversy with regard to the interpretation of the evidence from the Danube Gorges Mesolithic-Neolithic sites is focused on this time span of only several centuries. Srejović as well as Voytek and Tringham identified this phase as Mesolithic/Neolithic, suggesting contacts between foragers and farmers. Radovanović identifies it as her Mesolithic phase 5 and Boroneanț sees it as the last, fourth stage of the Lepenski Vir-Schela Cladovei culture. Somewhat different from these divisions, Jovanović identifies this phase as Early Neolithic 1 and more recently as ›Padina A–B‹ or ›contact‹ period[101]. Among these authors, there are significant differences with regard to what sites/phases are chosen to represent this phase (Table 2).

On the basis of Srejović's understanding of the stratigraphy of Lepenski Vir that assumes a hiatus in the occupation of the site between his Late Mesolithic phase of trapezoidal buildings and Early Neolithic Starčevo occupation[102], Srejović suggests that this Mesolithic/Neolithic period was not represented at Lepenski Vir but he identifies it in relation to phase Padina B1, as well as the occupation of the sites of Kula and Alibeg (Table 2). This late writing of Srejović[103] on the topic by assigning phases Padina B2 to the contact period and Padina B3 to the Early Neolithic, both represented by trapezoidal buildings as their main architectural features, was an

99 Borić – Dimitrijević 2009.
100 Borić – Miracle 2004.
101 Jovanović 2008.
102 Srejović 1972.
103 Srejović 1988; Srejović 1989.

important concession by Srejović to Jovanović, with the recognition that trapezoidal buildings at Padina, as Jovanović claimed from the beginning, were associated with the Early Neolithic Starčevo pottery.

Rejecting Srejović's suggestion about a gap in the occupation of Lepenski Vir between the Mesolithic and the Early/Middle Neolithic, Voytek and Tringham saw a continuation in the use of Lepenski Vir during this period, and these authors related phase Lepenski Vir IIIa, as identified by the excavator, to the Mesolithic-Neolithic period. Further, the same authors attributed phase Padina B also to the Mesolithic/Neolithic period. Similarly, Boroneanț saw Padina B as the fourth and last stage in the development of his ›Schela Cladovei-Lepenski Vir culture‹, identifying the same phase also at Alibeg II and Ostrovul Mare, km 873/875.

For Radovanović, this period comes under her Mesolithic phase 5, and represents the last stage in her division of Lepenski Vir phase I into three phases (Lepenski Vir I–1–3), the division which was based on a typology of constructional/stylistic elements in the supposed development of trapezoidal buildings at Lepenski Vir and Padina. Based primarily on the data from the site of Padina, Radovanović[104] suggests that at this time pottery appears in the Danube Gorges for the first time. On the other hand, with regard to her own division of trapezoidal buildings of Padina B into subphases B(I)–B(III) on the basis of the same criteria used in the phasing of Lepenski Vir trapezoidal buildings, Radovanović suggests that phase B(II) should be related to this period; phase B(I) was related to the mid-7th millennium, i.e. the Late Mesolithic (her phase 4), and B(III) to her last, sixth phase of the Mesolithic development in the Danube Gorges, i.e. period between c. 6000 and 5500 BC. More recently, Garašanin and Radovanović[105] published two photos that show the association of pottery also with the floors of two trapezoidal buildings from Lepenski Vir: buildings 4 and 54 (Fig. 13), reaffirming the conclusion about the appearance of Early Neolithic pottery in this period.

Finally, based on the stratigraphy of Padina B and the evidence that unambiguously shows the association of Early Neolithic Starčevo pottery with trapezoidal buildings at this site, Jovanović suggested that this whole period be called Early Neolithic, which he divided into 3 phases: Early Neolithic 1 to 3. For Jovanović, Early Neolithic 1 is only found at Lepenski Vir and is related to phase proto-Lepenski Vir (but see above about the Early Mesolithic dating of this phase based on new radiometric dates), while Early Neolithic 2 relates to the main building activities with regard to the construction of trapezoidal structures at both Lepenski Vir (phase I–II) and Padina (phase B1–2). In his more recent writings, Jovanović[106] refers to the phenomenon of trapezoidal buildings in the Danube Gorges as the ›Lepenski Vir culture‹, understood *sensu stricto* as confined to the sites found in the Upper Gorge of the Danube. Such an understanding of the culture history designation ›Lepenski Vir culture‹ is very different from the use suggested by Boroneanț under the label ›Schela Cladovei-Lepenski Vir culture‹. According to Jovanović, the Lepenski Vir culture is significantly different from the Late Mesolithic developments in the region and should be seen as a variant of the Starčevo culture. However,

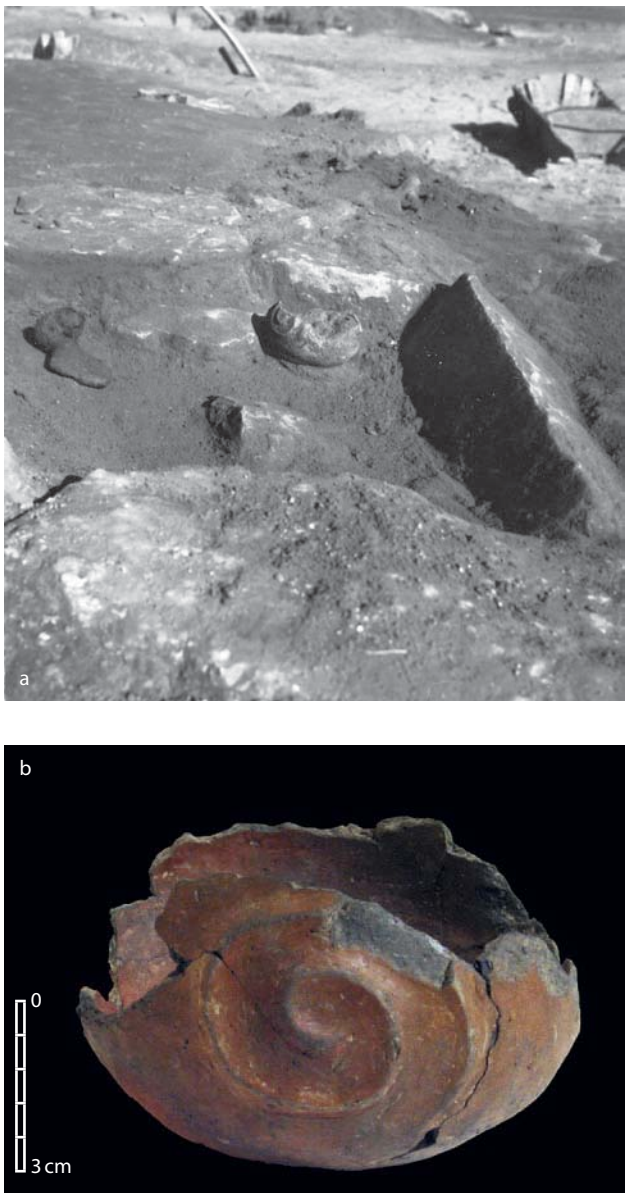

Fig. 13 (a) *In situ* Early Neolithic Starčevo ceramic vessel with spiral ornament in the ›ashplace‹ of Building 54, Lepenski Vir (Faculty of Philosophy, Belgrade University); (b) National Museum, Belgrade, Inv. no. 257 (field inv. no. 752).

deviating somewhat from his earlier phasing of the period that is summarized in Table 2, in more recent years, Jovanović[107] recognizes the existence of the ›contact‹ phase, designating a period of interactions between the descendants of the local, Late Mesolithic communities in the Danube Gorges and incoming Early Neolithic groups. Jovanović refers to this phase as Padina A–B.

Existing radiometric evidence requires some adjustments to each of the synchronizations between sites/phases proposed by the quoted authors. Starting from the iconic site of the region, Lepenski Vir, with regard to the synchronizations proposed by Srejović and on the basis of radiometric dates, it is not possible to maintain his opinion about a hiatus at Lepenski Vir during this period. The construction of trapezoidal buildings as well as the celebrated boulder artworks

104 Radovanović 1996.
105 Garašanin – Radovanović 2001.
106 Jovanović 2004; Jovanović 2008.
107 Jovanović 2008.

from Lepenski Vir, as the most prominent features of the site, should be dated exactly to this phase. The phase with trapezoidal buildings most likely started only around 6200 cal BC, and most of the trapezoidal buildings might have been abandoned by around 5900 cal BC[108]. The representative sample consists of 36 charcoal dates that mostly dated the upper constructions of Lepenski Vir trapezoidal buildings as well as new AMS dates on animal (22 dates from 20 different contexts) and human (18 dates for 15 burials) bones related to the occupation or abandonment of trapezoidal buildings at Lepenski Vir (see Appendix 1). The absolute span of only two or three hundred years, and likely even less[109], for the flourishing of building activities related to trapezoidal structures at Lepenski Vir significantly compresses Srejović's phase I. Thus, it is difficult to maintain the excavator's five subphases, which, similarly to Ivana Radovanović's more recent re-phasing of Lepenski Vir into I–1–3[110], remain largely guess works before more extensive and systematic dating of each building is accomplished along with statistical modeling in order to narrow the magnitude of error. On the whole, radiometric dates for building activities during newly defined phase I–II[111] better correspond with Srejović's stratigraphic logic of sequencing buildings to particular phases on the basis of their superimposing and inter-cutting than with Radovanović's stylistic logic, i.e. her typology of hearth forms, ash-places, entrance platforms, and presence/absence of flat stone-supports around rectangular hearths as reliable chronological indicators[112].

The short chronological span for the phase of trapezoidal buildings also suggests that phase Lepenski Vir II as defined by the excavator of Lepenski Vir is not stratigraphically realistic. This has already been shown by overlapping plans of the phase I buildings and stone outlines that the excavator of the site attributed to Lepenski Vir phase II[113]. According to Srejović, phase II at Lepenski Vir was characterized by buildings that had stone walls made in the shape of trapezes, repeating the outline of supposedly earlier limestone floors of his phase I. However, the trapezoidal buildings must be envisioned as dug-in features (Fig. 14)[114] with their rear, narrow side dug into the slope – these features were dug into

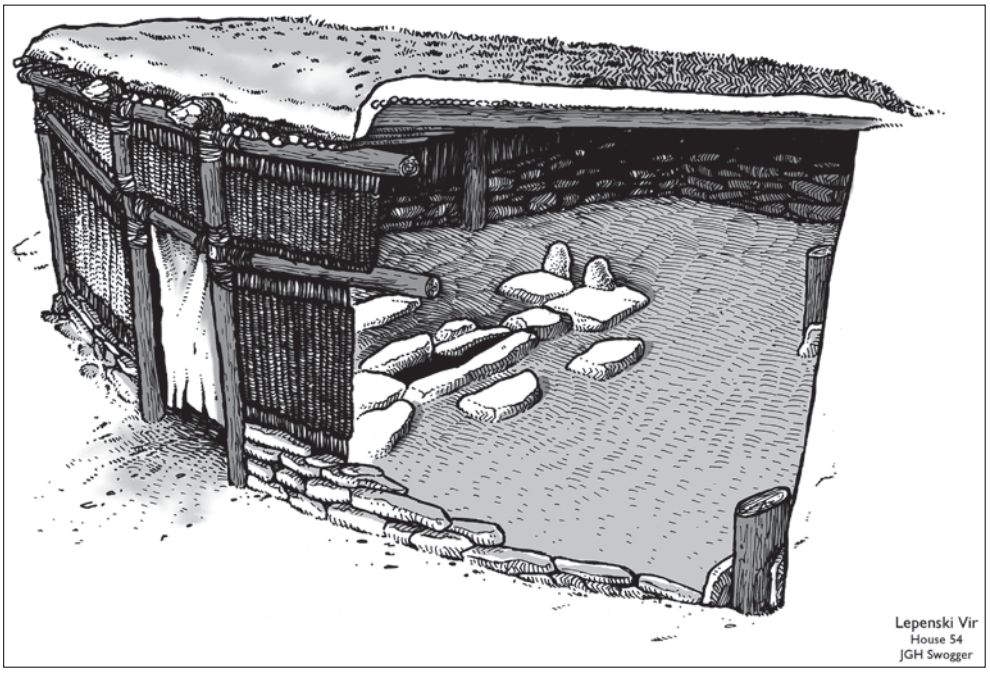

Fig. 14 Reconstruction of Building 54 from Lepenski Vir (drawing J. G. Swogger).

108 Borić – Dimitrijević 2009; cf. Bonsall et al. 2008. With regard to the radiometric evidence from Lepenski Vir, one should note that a number of recent dates on human burials from this site, reported by Bonsall et al. (2008), were likely affected by the previously mentioned problem of ultra filtration in the ORAU (see footnote 84). These are the following dates and burials: OxA-11715 (Burial 60), OxA-11698 (Burial 61), OxA-11704 (Burial 14), OxA-11696 (Burial 54c), OxA-11693 (Burial 26), OxA-11697 (Burial 54e), OxA-11692 (Burial 7/I), OxA-11718 (Burial 62), OxA-11706 (Burial 29), OxA-11717 (Burial 30), OxA-11703 (Burial 69), OxA-11695 (Burial 9), OxA-11694 (Burial 8), OxA-11719 (Burial 2), OxA-11699 (Burial 4), OxA-11700 (Burial 54d), OxA-11701 (Burial 45b), OxA-11705 (Burial 79a), OxA-11702 (Burial 89a) and OxA-11716 (Burial 18). In the future, these dated samples must be remeasured.

109 Borić et al. forthcoming.

110 Radovanović 1996; Radovanović 2000.

111 Borić – Dimitrijević 2007; Borić – Dimitrijević 2009.

112 See Borić 2002a; Borić – Dimitrijević 2005, 45 f.

113 Borić 2002b, fig. 7–9.

114 On the existing photographs of Lepenski Vir, one sees terraced areas with pedestalled building floors. This situation is due to digging the site largely in arbitrary levels by which features, such as trapezoidal buildings, were not excavated by emptying the fill of a building as one would do if excavating stratigraphically. Trapezoidal building floors were exposed by excavating spits across a particular level, which also included sterile soil adjacent to the building floors and which occasionally contained older Mesolithic deposits. Such an excavation strategy created this misleading, largely two-dimensional perspective of trapezoidal buildings (see Borić 1999; Borić 2002b; Borić 2008).

the sloping terrace where the site is situated. It is more likely that these stone constructions assigned to a separate phase were part of the same trapezoidal buildings with limestone floors assigned by the excavator to phase I. Thus, vertical stone walls existed on the level above limestone floors, built in dry wall technique around buildings' floors and cut sides. The overlap of the plans of phases I and II clearly shows the match between these stone constructions and trapezoidal limestone floors[115]. Moreover, on the published section of the western part of the settlement of Lepenski Vir, which runs through the rear area of Houses 43, 34, 27, 20, 33 and 32[116], phase II is not marked, which might lend further support to the conclusion about its elusive character. Finally, no activity areas were reported with regard to the ›floor‹ level of these structures, with the exception of the largest building at the site, XLIV[117]. Therefore, trapezoidal stone walls previously attributed to phase II were part of the same phase I buildings. Henceforth Borić and Dimitrijević[118] suggest treating Srejović's phases I and II as a single phase, referring to this building horizon and phase of occupation at Lepenski Vir as I–II.

The new radiometric dates also suggest no temporal break between phases Lepenski Vir I–II and phase III[119]. The dates indicate that Srejović was right to separate the latter as it seems that most of the trapezoidal buildings were abandoned by 5900 cal BC and that a new and different occupation pattern commenced at the site in the period following 5900 cal BC. Yet some of the dates indicate that, at the current resolution of the chronological scale, there could have been some overlapping between the use of some of the trapezoidal buildings, perhaps primarily for the interment of human burials (e.g. House 21 and Burials 7/I and II), and the new types of contexts that appear around 5900 cal BC.

Burials found at Lepenski Vir during this phase were often placed in burial pits made through the floors of trapezoidal buildings, probably upon their abandonment as domestic features. There are also burials that can be attributed to this phase found in the settlement space around trapezoidal buildings, frequently in groups of several burials. The Late Mesolithic burial rite – extended supine burials parallel to the Danube and with their heads pointing downstream – remains the norm during phase I–II at Lepenski Vir. Forty neonate burials were found placed underneath the floors of 17 trapezoidal buildings at Lepenski Vir[120]. The practice of burying neonates as separate interments underneath the floors of buildings might be seen as another feature that points to influences of the Neolithic world with which the communities in the Danube Gorges came into contact possibly already during the Late Mesolithic, and much more intensively again in the period after c. 6300 cal BC[121]. Amongst many Neolithic communities across Anatolia and the Balkans one finds a high frequency of neonate and child burials in association with buildings, especially underneath their floors[122].

There are both charcoal and AMS measurements dating the occupation and abandonment of very similar trapezoidal dwellings found at Padina's Sector III, although from a more modest sample of contexts than those from Lepenski Vir. In general, these dates from Padina, as expected, correspond well with the dating of phase I–II at Lepenski Vir. Out of four older charcoal dates associated with the burned remains found on the floors of trapezoidal buildings at Padina[123], three have ranges between 6160 and 5725, whilst one gives a somewhat younger range 5630–5380 all expressed as cal BC at 95 per cent confidence (see Appendix 1 for details). AMS dates for Padina's trapezoidal buildings confirm the validity of charcoal dates and give the following ranges: 6410–6090 (OxA-9056, building 9), 6052–5895 (OxA-16937, building 17), 5990–5720 (OxA-9052, building 18) and 5780–5560 (OxA-9054, building 15), all cal BC at 95 per cent confidence. The dates from buildings 15 and 18, located at the uppermost row of buildings at this sector confirm the initial dating of these structure by the excavator of the site, Jovanović[124], suggesting that these structures were the last to be occupied/abandoned at Padina. The latest use of these features would fall into the Early/Middle Neolithic time span, i.e. in the period after 5950 cal BC. If confirmed by future, more extensive dating of these buildings at Padina, such late dates could go in favour of an interpretation that these trapezoidal buildings, typical of the Transformation/Early Neolithic phase in the Upper Gorge of the Danube, continued to be used for domestic activities also during the Early/Middle Neolithic period at Padina. This would mean that different cultural traditions in this region, or at least at this site, might have merged successfully, and that this hybrid cultural form might have lasted for several centuries.

Remains of three trapezoidal buildings with rectangular stone-lined hearths in their centers were also found at Padina's Sector I[125]. Presently, there are no radiometric dates for these buildings. However, there are two dates for a group burial consisting of three individuals (4, 5 and 5a) found at Sector I and the obtained ranges indicate the Transforma-

115 Borić 2002b, fig. 9.
116 Srejović 1969, fig. 6.
117 House XLIV is the largest structure found in the rear of the site. It also contained the largest number of representational boulders amongst all other buildings at Lepenski Vir. Sculpted boulders were placed around the building's large stone-lined rectangular hearth. This building might have had some communal and ceremonial use (e.g. as ›men's house‹ or similar). No limestone floor was found in the area around the hearth of this building and for this reason it was assigned by the excavator to phase II. However, limestone flooring was found in the rear of House XLIV. This flooring was assigned to phase I and named House 57. This might have been an earlier building structure at this place with the same building outline as House XLIV or part of the same structure that was used over a long period of time, possibly resulting in the damage of the floor around the hearth area. It is also possible that hearth area might have been rearranged several times in the course of the history of this structure. OxA-16010 dates crouched headless Burial 19 found at the floor level of House XLIV/57. This burial belongs to phase III and is dated in the range 5984–5752 at 95 per cent confidence and represents a *terminus ante quem* for the use of this building.
118 Borić – Dimitrijević 2009.
119 Contra: Srejović 1969, 161; Srejović 1972, 139.
120 Borić – Stefanović 2004; Stefanović – Borić 2008.
121 Borić 2007a.
122 cf. Bachvarov 2008.
123 cf. Jovanović 2008, fig. 25.
124 Jovanović 1987; Jovanović 2008.
125 See Jovanović 2008 and references therein; also Borić 2002a, Appendix 3.

tion/Early Neolithic dating of these burials: AA-57770 for stratigraphically older burial 5 in the range 6224–5878 and AA-57769 for stratigraphically younger burial 4 in the range 6061–5841, both at 95 per cent confidence (see Appendix 1). Interestingly, stratigraphically older Burial 5 was reported as a crouched inhumation whilst younger Burial 4 was placed in extended supine position oriented perpendicular to the Danube with the head pointing toward the south-west. A bone awl accompanied Burial 4. Remains of burned bones were found next to the skeleton[126].

At several other sites during this period one finds a similar practice of overlapping burials in particular places. At Hajdučka Vodenica, there is a continuity from the Late Mesolithic to the Transformation phase in the use of a particular zone for burials around a rectangular stone-lined hearth surrounded by reddish floor remains. In the back area of the hearth, between large, naturally occurring rocks, a burial ›chamber‹ was formed with the remains of at least 23 individuals, and with the evidence of overlapping and disturbing of older burials[127]. There were also three burials placed on the reddish flooring that surrounded the rectangular central hearth. The first radiometric measurements on three burials from this zone, found approximately at the same level, gave almost synchronous Late Mesolithic dates[128]. However, due to the previously mentioned ultra filtration problem (see footnote 84), new measurements on these samples gave the following ranges after the correction for the aquatic reservoir effect: 6410–6096 (OxA-17146: Burial 12), 6361–6050 (OxA-16942, Burial 15-›younger‹) and 6368–6068 (OxA-16941, Burial 20) all cal BC at 95 per cent of confidence. These ranges seem to fall exactly between the Late Mesolithic and the Transformation/Early Neolithic periods, although, due to the reservoir effect, their ranges are rather spread out across this period. It is significant that the typical Late Mesolithic burial canon absolutely dominates the mortuary domain at this site during this period.

At the site of Vlasac, on the other hand, recent excavations discovered a vertical sequence of burials that, while similarly suggesting a continuity of burial practices from the Late Mesolithic into the Transformation/Early Neolithic period in the use of the same place for burials and in the position and orientation of the deceased, also indicates important changes being introduced during this period with regard to the aesthetics of body decoration. Adult female H63 dated in the range 6232–6018 cal BC at 95 per cent confidence (OxA-16542) was placed almost directly over several centuries older, Late Mesolithic burial that was partly disarticulated by this interment, and the bones of which were placed in the infill of H63 (this older Late Mesolithic Burial H81 was found placed over another older burial). The new interment of H63 followed the same position and orientation of this older burial. Subsequently several other burials (two juveniles, two neonates and an old adult female) were placed over H63, partly damaging this skeleton with evidence of exhumation and secondary burning of bones of earlier burials[129]. After the last interment of an old adult, the place was abandoned, and a red deer skull with antlers was placed over the pelvis of the deceased and covered by large blocks of stone. This red deer skull with antlers was directly dated giving the range 6006–5838 cal BC at 95 per cent confidence (OxA-16544), which suggests the end date for the Transformation phase at Vlasac. The first burial at this location that can be representative of the period, Burial H63, as well as subsequent burials in this location, which are all dated to this phase, were accompanied by both old (Mesolithic) and new (Neolithic) types of ornaments: on the one hand, perforated carp (Cyprinidae) teeth appliqués were most likely part of a headdress of Burial H63, and on the other, next to the atlas of this individual an ovoid-shaped bead made of Spondylus was found (Fig. 15). Several other Spondylus beads were found in the infill of this upper part of the burial place along with discoid-shaped beads made from marble and smaller ones made from reddish or whitish limestone[130]. The latter type of limestone beads were also found at Lepenski Vir in four burials (Burials 46, 54e, 87a–b and 93) dated to Lepenski Vir phase I–II. An additional Spondylus bead was found in Burial 87a–b from this site[131]. In this context, one should also mention Hoard 1 from Lepenski Vir – a ceramic vessel that contained 62 ovoid-shaped Spondylus beads, four green ovoid-shaped nephrite beads, 4 beads made of marine gastropod *Columbella rustica*

Fig. 15a–b *In situ* Spondylus bead found around the neck of Burial H63 excavated at Vlasac in 2006 (photo: D. Borić).

126 Živanović 1973/1974, 143 f.
127 Borić – Miracle 2004 and references therein; Jovanović 2008, fig. 37–42.
128 Borić – Miracle 2004.
129 For details see Borić 2010; Borić et al. 2009.
130 Borić 2006; Borić 2007b; Borić 2008.
131 cf. Srejović – Babović 1983, 196 f.

and a bone pendant[132]. However, judging by its stratigraphic position, it seems that the deposition of this hoard should be related to the succeeding phase III at Lepenski Vir (see below).

The burial place described at Vlasac furnishes the first evidence that during the period discussed, which is contemporaneous with the phase of trapezoidal buildings at Lepenski Vir (phase I – II), Vlasac was still being used, most likely, primarily as a burial ground. The appearance of Spondylus beads in Vlasac burials, which are by the orientation and the position of the deceased typical Late Mesolithic inhumations, suggests changes that primarily related to the bodily aesthetics in the choice of ornaments worn on the body surfaces starting from around 6200 cal BC. This is the time when the first Early Neolithic farming communities appear across the Balkans[133] and the beads, which appear at both Vlasac and Lepenski Vir at this time, in their form and the choice of raw material used could be compared to the beads found at various contemporaneous Early Neolithic sites in the Balkans and Anatolia, suggesting that the appearance of such ornaments in the Danube Gorges must have been the consequence of contacts with the expanding network of farming communities surrounding this region. Moreover, ornaments from *Cyclope neritea* marine gastropods, which were in particular documented in newly excavated Late Mesolithic burials at Vlasac (see above), disappear as a type of ›exotic‹ ornaments with the start of this period and Spondylus beads appear instead as a new type of long-distance material for decorative items, possibly among various other perishable materialities (e. g. items of clothing, etc.). One could speculate about the nature of these interactions and whether particular items were traded, and as finished products came into the local community, or whether they were locally manufactured. There was no manufacturing waste that would indicate that Spondylus beads were locally manufactured. On the other hand, it would not be unreasonable to assume that discoid limestone beads might have been manufactured locally under the influence of similar objects found amongst the Early Neolithic communities.

One of these contemporaneous Early Neolithic communities in the vicinity of the Danube Gorges sites might have been the one that founded the newly established site of Ajmana, located not far from the downstream entrance into the Danube Gorges, in the area where one also finds several older Late Mesolithic sites (see Fig. 1). At Ajmana, one finds a group burial containing 17 mostly juvenile individuals placed in typically Neolithic flexed positions in what seems to have been three levels of burial interments[134]. Two of these skeletons have recently been dated and gave the following ranges: 6214–6008 (AA-58322, Burial 7) and 6030–5842 (AA-58323, Burial 6) cal BC at 95 per cent confidence[135]. There are further indications that at least one of these individuals was

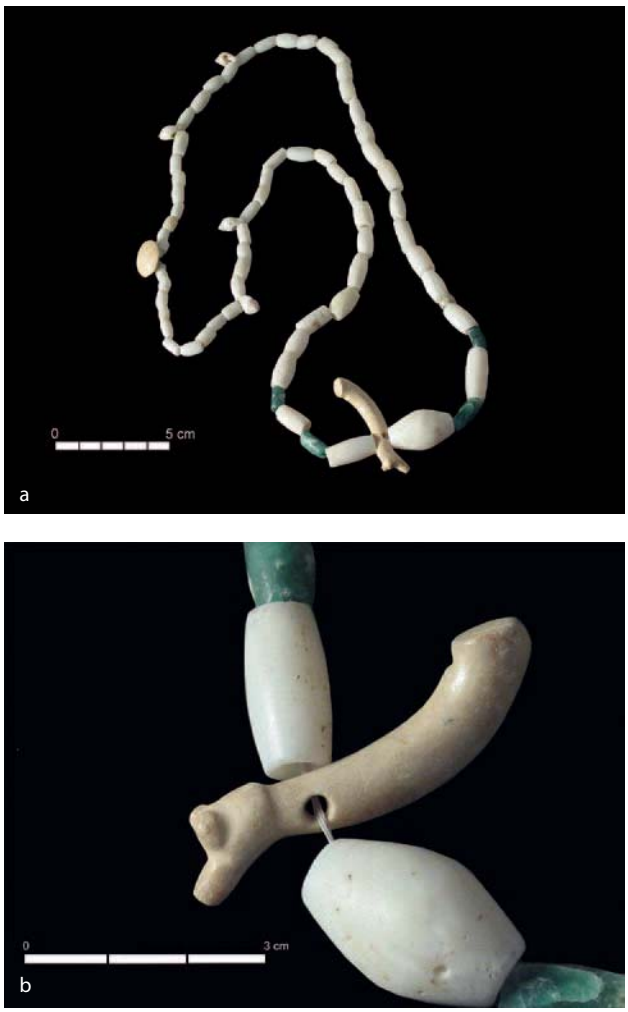

Fig. 16a – b Spondylus, nephrite and *Columbella rustica* beads and a bone pendant found inside an Early Neolithic Starčevo ceramic vessel (Hoard 1, quad. b/VI, spit 1), National Museum, Belgrade, inv. no. 187 (field inv. no. 770).

the first generation of migrants into this region[136]. Such dating may represent the best evidence thus far about the conterminous presence of typically Early Neolithic settlement sites alongside communities at sites with lifestyles grounded in the older patterns of forager occupation. More dates from Ajmana would be crucial in order to confirm this chronological patterning.

The radiometric dates discussed indicate with some certainty that Vlasac, Padina and Hajdučka Vodenica were used during what is here called the Transformation/Early Neolithic period in the Danube Gorges. This pattern goes against the model proposed by Bonsall et al.[137] suggesting that all sites in the Danube Gorges except for Lepenski Vir were abandoned

132 Srejović (1969, 173; fig. X. XIV; Srejović 1972, fig. IX) attributes these four green beads to paligorskit stone, and in the published colour photo they appear azurite blue. However, these beads are green (Fig. 16), and they were made of nephrite, which appears in several other contexts attributable to phase I – II at Lepenski Vir, including Burial 46. Objects made of nephrite (amulates and similar) have been found at a number of Early-Middle Neolithic sites in the Balkans (see Antonović – Stojanović 2009). A similar bone amulet was found recently at Tumba Mađari, see Kanzurova-Zdravkovski, this volume fig. 18.

133 cf. Whittle et al. 2002; Whittle et al. 2005.

134 Stalio 1992.

135 No correction for the freshwater reservoir effect was applied to these measurements prior to their calibration since their $\delta^{15}N$ values were 10 ‰ (Burial 7) and 10.5 ‰ (Burial 6) respectively, suggesting a limited contribution of fish in the diet of these individuals.

136 Borić – Price forthcoming.

137 Bonsall et al. 2002.

due to major floods in the period from around 6300 to 5950 BC, i.e. the time span that is amongst palaeo-climatologists related to the so-called 8.2 k BP event of temperature deteriorations in northern Europe. Bonsall et al.[138] base their model on the assumed gap in the distribution of radiometric measurements at all sites in the Danube Gorges except Lepenski Vir, which, in their opinion, could not have been abandoned since it bore symbolic importance for the local Mesolithic foragers. Borić and Miracle[139] rejected this model on the basis of their critical re-examination of the evidence that Bonsall et al.[140] used to support their flooding hypothesis, and in particular on the basis of new radiometric dates from Padina and Hajdučka Vodenica. New and re-measured radiometric dates from Padina, Hajdučka Vodenica and Vlasac only further strengthen this conclusion about no conclusive strands of evidence that would point to possible alterations of settlement patterns in the Danube Gorges due to climatic reasons during this period. On the other hand, changes seen at several sites seem to relate to intensified contacts between local forager communities in this region and the expanding network of Early Neolithic communities in the surrounding areas of the Balkans. One should note, however, that despite a large number of available dates for the site of Schela Cladovei (Appendix 1), the Transformation/Early Neolithic phase, which is now well established in the Upper Gorge of the Danube and also at Hajdučka Vodenica in the Lower Gorge, is not represented at Schela Cladovei, and it remains to be clarified further to what extent other Late Mesolithic sites on the Romanian and Serbian banks of the Danube remained occupied during this period. There are some indications that the earliest typical Neolithic settlements, such as Ajmana, Knjepište or Ušće kameničkog potoka, might have been established at new locations exactly in the areas downstream from the area of the Gorges *sensu stricto*, and not far from the place where Schela Cladovei was located. Hence it could be that Schela Cladovei and similar sites inhabited during the Late Mesolithic were temporarily abandoned during the period of initial contacts between new farming groups and local foragers, and that a new line was being established, demarcating these different communities. However, more fieldresearch and radiometric dates are necessary in order to clarify the chronological resolution of this period at various sites in the region before taking this mere speculation more seriously.

Finally, a few words about the types of labels used to designate this chronological period in the Danube Gorges. In his recent review of the Danube Gorges Mesolithic sequences, Bonsall[141] very similarly distinguishes this period in terms of its chronological duration, yet, differing from the label proposed here, he calls the period ›Final Mesolithic‹. Various other authors have called it the ›Mesolithic/Neolithic‹ (Srejović, Voytek and Tringham) or ›contact‹ period (recently Jovanović, Roksandić). While none of these labels is entirely wrong, in my opinion, they do not stress enough the wider regional historical context to describe this chronological phase in the Danube Gorges. For instance, by giving the label ›Final Mesolithic‹ to this phase of important changes in the Danube Gorges one rightly emphasizes many continuities with the preceding Late Mesolithic but remains silent about Early Neolithic elements that appear during the period from c. 6200 to 5950 BC, when the region was a part of much wider processes of culture changes at a regional level. In order to emphasize both ›sides‹ of this (Mesolithic and Neolithic) story, the dynamics of the process of societal transformations that were taking place at an accelerated pace at this time as well as the Early Neolithic historical context, the label Transformation/Early Neolithic period is suggested in order to characterize this epoch in the Danube Gorges.

Early/Middle Neolithic (c. 5950/5900–5500 BC)

The doubts about labeling are also pertinent to the period from c. 5900–5500 BC, which is here designated as the ›Early/Middle Neolithic‹. For instance, In Parzinger's[142] chronological scheme for the development of the Neolithic and Chalcolithic cultures from the Carpathian Basin to the Taurus mountains in Anatolia, in particular influential amongst German scholars, the period is designated as horizon 1/Early Neolithic. Differently from this common practice, I use the label ›Early/Middle Neolithic‹ as a designation for the period that follows the earliest phase of the Neolithic in the Balkans (c. 6300–5900 cal BC) and lasts from c. 5900–5400 cal BC, i.e. up until the appearance of the first (Late Neolithic) tell sites in the northern areas of the Balkans and in the Carpathian Basin. After c. 5400 BC, throughout southeast Europe markedly different pottery production was introduced amongst many of the newly appearing Late Neolithic pottery styles/cultures when compared to the preceding period. There are obvious continuities between the periods designated here as the ›Early Neolithic‹ (c. 6300–5900 BC) and ›Early/Middle Neolithic‹ (c. 5900–5500 BC) across the Balkans, and in many areas of the northern Balkans it is often very difficult to distinguish the two periods on the basis of pottery typologies alone without the help of radiometric dates[143]. There are differences between the two periods in some diagnostic decorative pottery elements (e.g. monochrome and white-dotted painted pottery might have been an exclusive characteristic of the early period and linear and curvilinear dark painting of the later phase[144]), the pottery technology and the repertoire of pottery forms did not change much throughout the period from c. 6300–5500 BC, and in the areas surrounding the Danube Gorges the tradition is known as the Starčevo-Körös-Criş pottery complex. Although patterns of habitation remain similar throughout the period, it seems that the period after 5900 BC represents the consolidation of the earliest phase of the Neolithic spread across the region. This is clearly reflected in the Danube Gorges, where after the phase during which

138 Bonsall et al. 2002; but still also Bonsall 2008.
139 Borić – Miracle 2004.
140 Bonsall et al. 2002.
141 Bonsall 2008.
142 Parzinger 1993.
143 cf. Whittle et al. 2002; Whittle et al. 2005.
144 cf. Schubert 1999.

one finds both continuing patterns of Mesolithic existence and changes under the influence coming from newly established farming settlements, in the period after 5900 cal BC, the older Mesolithic elements seem to have disappeared at most of the sites (but see above about the dating of trapezoidal buildings 15 and 18 at Padina).

During the Early/Middle Neolithic phase in the Danube Gorges, at the site of Lepenski Vir, most of the trapezoidal buildings must have been abandoned, and the backfilled areas of some of the buildings were used for burials (e.g. Burials 8 and 9 in Building 24 and perhaps also Burial 7 in Building 21[145]). The changes seen at Lepenski Vir during this period fully justify Srejović's definition of phase III in the stratigraphy of the type-site. For instance, it seems that various reported pits, found in the rear area of the terrace in the back of the zone with trapezoidal buildings, were dug during this Early/Middle Neolithic phase III. Also, at this time several domed ovens appear at Lepenski Vir[146]. In one case, it seems that the stone rectangular hearth of Building 5 was adjusted for the construction of a domed oven[147]. Although burned daub remains with wattle impressions were found at Lepenski Vir, no outlines of above-ground structures were noticed in this phase. This pattern is similar to many other Early/Middle Neolithic sites across the Balkans, likely reflecting a specific pattern of abandonment and possibly intentional destruction and dismantling of above-ground dwellings[148].

Burial practices also change during this period with the appearance of flexed/crouched inhumations at Lepenski Vir. Amongst these 20 burials found in crouched positions, there were several individuals representing the first generation of migrants into this region[149]. Considering that there are reported cases of migrants into the Danube Gorges already during preceding Transformation/Early Neolithic phase (see above), it seems that there was a new wave of migrants coming into the region and being buried at Lepenski Vir during phase III. Some of these individuals (Burials 32a and 88) have the first signs of caries on their teeth[150], likely suggesting changes in dietary practices and the increasing use of cereals.

Again, in contrast with the preceding phase I–II at Lepenski Vir, during which no domestic animals apart from dogs were found on the floors of trapezoidal buildings, with the start of phase III, the first domestic animals deposited in pits and other Neolithic features make their appearance at this site[151]. A sample of these domestic animals has now been dated directly. The following ranges are obtained for the dated specimens: 6000–5845 (OxA-16212, *Capra hircus*), 5988–5798 (OxA-16253, *Capra hircus*), 6002–5845 (OxA-16213, *Bos taurus*), 5996–5811 (OxA-16211, *Bos taurus*) and 6005–5841 (OxA-16079, *Sus domesticus*), all cal BC at 95 per cent confidence[152] (see Appendix 1). Finally, at present, before a detailed publication of all finds related to phase III at Lepenski Vir and more radiometric dates, the use of Srejović's subphases IIIa and IIIb cannot be justified and hence this phase in the stratigraphy of Lepenski Vir is here referred to as phase III only.

On the other hand, as previously mentioned when discussing radiometric dates and evidence from Padina's Sector III (see above), there is no such a clear-cut change in patterns of inhabitation at Padina in comparison to Lepenski Vir during the same period. Radiometric measurements as well as the abundance of Starčevo pottery in association with trapezoidal buildings 15 and 18 at this site[153] may suggest that at Padina the traditional form of trapezoidal buildings was not immediately abandoned in the period after 5900 BC. This longer adherence to the older Mesolithic ways of inhabitation seen at Padina is in accord with the absence of domestic animals apart from dogs in association with these trapezoidal buildings[154].

In the course of new excavations at Vlasac, a concentration of occupation remains with Starčevo pottery was found stratigraphically above the stratified burial sequence previously described (see above). Here, the range 6006–5838 cal BC at 95 per cent confidence (OxA-16544) obtained for the red deer skull, laid on top of the last burial, represents the *terminus post quem* for the appearance of Early/Middle Neolithic pottery at this part of the site[155]. We cannot exclude the possibility that in other areas of the site, pottery did not appear at an even earlier date. The first excavations at Vlasac in 1970–1971 also produced a number of pottery contexts[156], suggesting a continuing use of the site from the Transformation/Early Neolithic into the Early/Middle Neolithic periods. Yet no remains of domestic animals apart from dogs have been associated with this Middle Neolithic phase at Vlasac. Efforts at retrieving botanical remains by an extensive program of flotation of soil samples coming from new excavations at the site did not result in the recovery of charred remains of domestic plant species[157].

A similar lack in the recovery of plant remains, and domestic plants in particular, has been reported for Schela Cladovei with regard to the Early/Middle Neolithic, i.e. post-5900 BC, occupation at this site[158]. However, at Schela Cladovei several bone spoons[159] may suggest changes in dietary practices and the introduction of cereals to the diet. It is possible that during the Middle Neolithic phase, many sites in the Danube Gorges that were inhabited throughout the Late Mesolithic and Transformation/Early Neolithic phases were still being used primarily for specialized activities, notably fishing. The adoption of a food-producing economy still might have had a limited impact on the modes of subsistence among the populations found in this region. Such a pattern may also suggest that despite the arrival of a number of migrants in the region during this period, at many sites in the Danube Gorges traditional ways of subsistence, largely based on fishing and hunting, might have been maintained, especially in those areas of the Gorges not suitable for farming. According

145 See Borić – Dimitrijević 2007; Borić – Dimitrijević 2009.
146 Borić – Dimitrijević 2007.
147 Srejović 1972; Perić – Nikolić 2004.
148 See Borić 2008.
149 Borić – Price forthcoming.
150 Grga 1996.
151 Borić – Dimtrijević 2005.
152 Borić – Dimitrijević 2007; Borić – Dimitrijević 2009.
153 Jovanović 1987; Jovanović 2008.
154 Dimitrijević – Borić forthcoming.
155 Borić 2006; Borić 2007b.
156 Srejović – Letica 1978, taf. CXXV–CXXVII; unpublished data.
157 Filipović forthcoming.
158 Bonsall 2008, 260; Mason et al. 1996.
159 Bonsall 2008, fig. 10, 9.

to such a model, local foragers might have fully adopted pottery, ground stone tools, so-called ›Balkan‹ flint and the Early Neolithic technological *chaîne opératoire*, along with the new aesthetics in body decoration as well as religious, ideological and social outlooks of the Neolithic mindset before domestic animals became staple resources.

New fieldwork in the hinterland of the Danube Gorges brought to light evidence about the existence of an Early/Middle Neolithic site located on Košo Hill, above the site of Lepenski Vir, at an altitude of between 310 and 318 m asl[160]. The site of Aria Babi is a single occupation site founded on the side of the hill sloping toward the Danube. Micromorphological analyses indicated the existence of acidic brown forest soil, probably developed under wooded conditions, which are commonly evident in the immediate surroundings[161]. Due to the acidity of the soil, no bones or plant remains have been recovered from this site, and currently no absolute dates are available for this occupation. No dwelling structures were discovered and there were several pits/depressions where pottery and stone accumulated. Starčevo type pottery found at the site is very similar to numerous other Early/Middle Neolithic sites across the region[162]. There are similarities in shapes and decoration of pottery from Aria Babi with the pottery assemblage from Lepenski Vir[163]. Some of the decorative motifs found at both sites are band appliqués with regular finger imprints as well as regular finger imprints on the rims of vessels (Fig. 17). No painted pottery is found at the site, which could be the consequence of highly acidic soil, causing visible damage on many of the recovered pottery fragments. The knapped stone assemblage is dominated by blade technology and over 90 per cent of the flint assemblage consists of the so-called ›Balkan‹ white-spotted yellow flint that most likely originates in northern Bulgaria (Fig. 18)[164]. This type of flint is also abundantly found at Lepenski Vir during both phases I–II and III[165] as well as other sites on the Danube banks[166] during the Middle Neolithic phase. The indirect evidence of agricultural practices at Aria Babi is the presence of a retouched blade of dark grey raw material that had a macroscopically visible shine on the working edge, functioning as a sickle insert and as such was most likely used for harvesting[167]. In addition, three small obsidian pieces coming from the Carpathian sources were found at Aria Babi (B. Tripkovic, pers. comm.). A small discoid bead, similar to limestone beads found at Lepenski Vir and Vlasac during the preceding phase (see above), was also found.

Aria Babi might have been only one of many sites that during this period were established by clearing the patches of forested areas in the Danube Gorges hinterlands and where one may expect evidence of limited agricultural activities. It is one of the priorities of future field research in this region to uncover similar sites that do not suffer the bias of missing organic remains in order to specify in more detail the character of these occupations. On the other hand, many of the sites that were used during the Epipalaeolithic or Mesolithic periods were again occupied in the course of the Early/Middle Neolithic period (e.g. Cuina Turcului III where a sterile layer divides the Epipalaeolithic [phases I–II] and Early/Middle Neolithic [phase III] occupation of the site). Such a pattern indicates that a larger number of sites were being occupied during this period, although this high visibility of sites may partly relate to the fact that sites with pottery are more easily detectable than those without. However, one should not rule out the possibility of a demographic expansion in the number of people comprising different communities in this and the surrounding regions, possibly consisting of both local foragers and migrant farmers.

It appears that after c. 5500 BC, almost all of the previously used sites on the banks of the Danube in this region were abandoned and that there was a hiatus of more than a millennium in their use. In terms of culture history approaches, in the surrounding areas of the Balkans, the Starčevo Early/Middle Neolithic groups were replaced by the Middle/Late Neolithic Vinča groups using dark-burnished ware, which appeared from around 5400 BC[168]. Yet no early Vinča culture settlements reoccupied locales previously used from the Epipaleolithic through to the Middle Neolithic. In addition, only few sites are presently known dated to the Late Neolithic period found in the immediate hinterland of the Danube Gorges or on the banks of the Danube: the Early Vinča phase sites of Gornea and Orniţa-Liubcova[169], both found in the Liubcova valley, Ostrovu Golu in the vicinity of Ostrovul Banului, farther downstream the Danube[170]; and the late Vinča phase settlement of Zbradila-Korbovo found in the downstream Ključ area[171]. In addition, the mining site of Rudna Glava is found inland some 20 km as the crow flies in southwest of Lepenski Vir, and it contains evidence of the use of mining shafts dating to the Vinča culture[172]. A conclusion one can draw from this change in the settlement pattern with the start of the Late Neolithic in the Danube Gorges is that the fully developed agricultural and stock-breeding economy characterizing Vinča groups completely ignored or avoided the riverine resources of the Danube Gorges, and that only a few, newly founded settlements in this region during the Late Neolithic utilized those areas more suitable for agricultural practices. However, the question remains why none of the locales occupied in the previous period, that must have been recognized and remembered with the start of the Late Neolithic, were not reoccupied?

A number of these Mesolithic-Early/Middle Neolithic sites in the Danube Gorges were used again only after the end of the Vinča culture, after c. 4500 BC. Thus, the first post-Middle Neolithic use of Lepenski Vir can be connected with the Early Eneolithic Salkuţa culture (phase I–II) on the basis of only one burial (no. 2[173]) now dated in the range 4337–4246 before the correction for the aquatic reservoir effect or 4237–3974 cal BC, both at 95 per cent confidence after the

160 Borić 2007b; Borić 2008; Borić – Starović 2008.
161 French forthcoming.
162 e.g. contributions in Srejović 1988.
163 Perić – Nikolić 2004.
164 e.g. Biagi – Starnini 2010; Gurova 2008; Voytek 1987.
165 Kozłowski – Kozłowski 1982.
166 e.g. Mihailović 2004.
167 Gurova forthcoming.
168 Borić 2009 and references therein.
169 Comşa 1969, 11–44.
170 Lazarovici 1979.
171 Babović 1986.
172 Jovanović 1982; cf. Borić 2009.
173 Letica 1970.

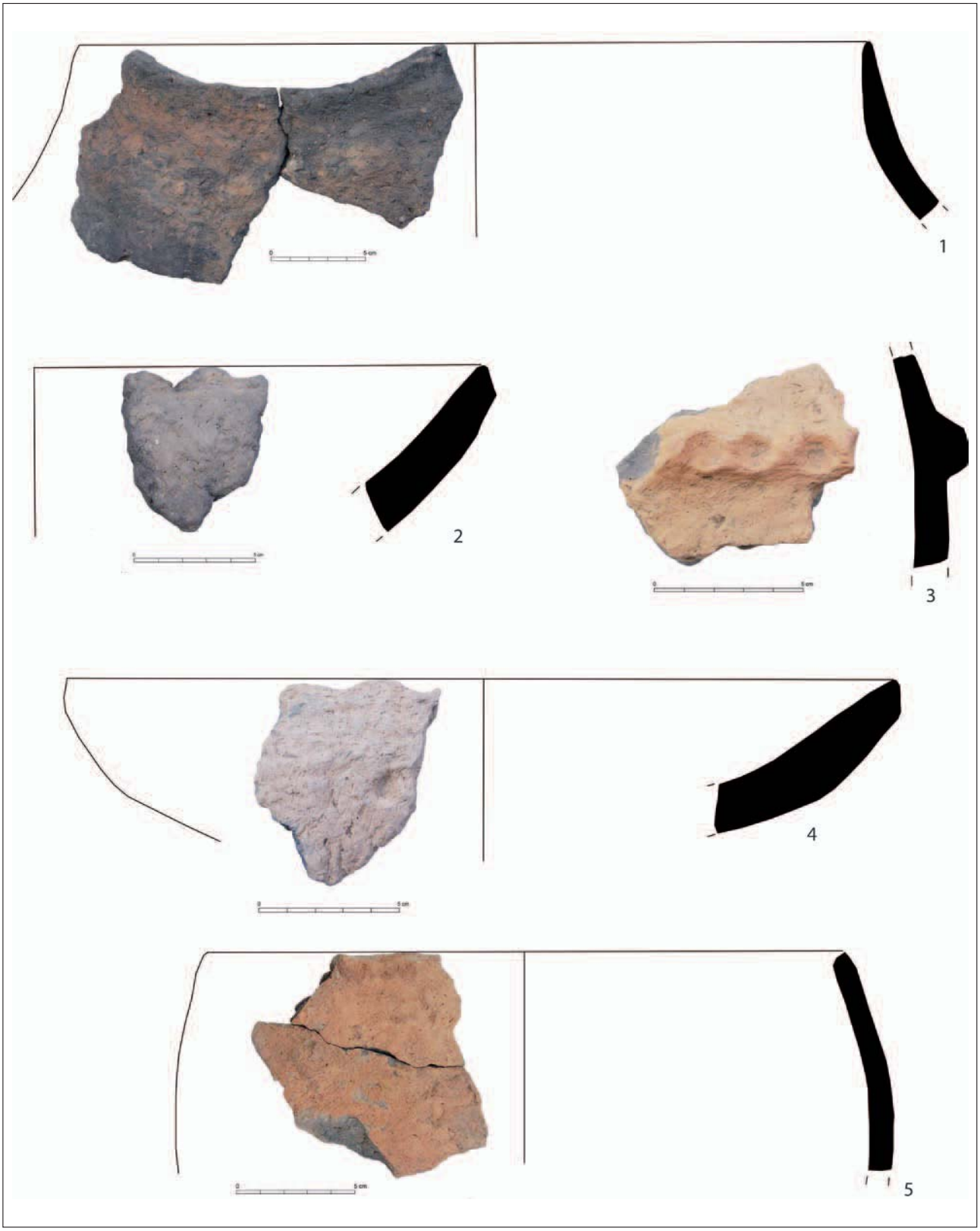

Fig. 17 Early/Middle Neolithic pottery from Aria Babi.

Fig. 18 Early/Middle Neolithic flint from Aria Babi.

correction for the aquatic reservoir effect (OxA-11719[174]). Occupation traces of the Early/Middle Eneolithic Sălcuța culture were also found at Ostrovul Mare and Veterani Terrace. Also, a late Sălcuța cemetery was found at Ostrovul Corbului[175]. At other sites, the first traces of occupation after the Middle Neolithic Starčevo levels relate to the Late Eneolithic Kostolac-Coțofeni groups (c. 3500–2800 BC). These sites are: Ajmana, Donje Butorke, Băile Herculane, Cuina Turcului, Lepenski Abri, Padina, Vlasac, etc. In addition, at two newly investigated caves in the Danube Gorges – Pešćera Mare and Tabula Traiana Cave – the first post-Pleistocene use of these caves, presumably, for pastoralist practices can be connected with the Late Eneolithic and Early Iron Age groups[176].

Conclusion

The period between 13.000 and 5500 cal BC in the Danube Gorges saw several major changes during which lifestyles of Final Pleistocene and Early Holocene foragers inhabiting this region were restructured. The evidence of the earlier phases of the Upper Palaeolithic in the region is still scarce; the existing data about Epipalaeolithic groups may suggest that the population whose traces were documented at Cuina Turcului and Climente II might have carried forward older cultural traditions. There were important symbolic and cultural similarities in shared decorative elements with contemporaneous communities living in the Apennine Peninsula and possibly in other areas of the Balkans. Marine gastropods found in Epipalaeolithic levels at Cuina Turcului also point to the existence of long-distance connections. The economy of these Epipalaeolithic groups suggests that oscillating climatic conditions characterizing the Younger Dryas might have constrained these groups to exploit ibex and chamois. Yet, many other species characteristic of Early Holocene Mesolithic economies in Europe were already hunted at the time along with the exploitation of riverine resources, including migratory species of fish.

The first known open-air sites on the banks of the Danube were occupied in the course of the Early Mesolithic period, which on the basis of the current radiometric evidence starts around 9500 BC, and most of these sites continued to be intermittently occupied up until 5500 BC. This settlement continuity might have related to these sites' excellent position for specialized fishing. The faunal remains, but also to some extent new sulfur isotope analyses[177], indicate that the economy of these communities might have depended as much on hunting as on fishing. There might have been a continuity with the preceding phase on the basis of the surviving decorative tradition of engraved bone and stone objects. The evidence for this period is sparse at present, especially for its earliest part, and more programmatic dating of contexts and objects that can be associated with this phase remains a priority. In many instances, Later Mesolithic and Neolithic occupation must have significantly damaged these early deposits. There are a number of burials from several sites associated with this period. Amongst the burials are those in seated lotus positions with crossed legs, with burials from Lepenski Vir, Padina and Vlasac now dated to the later half of

174 Bonsall et al. 2008.
175 Roman 1996.
176 Borić – Jevtić 2008; Kapuran et al. 2007.
177 Nehlich et al. 2010.

this long period, which ends by around 7400 BC. Some of the earliest rectangular stone-lined hearths might have appeared at the end of this period, i. e. c. 7500 cal BC.

The Late Mesolithic in the Danube Gorges is the continuation of earlier Mesolithic ways of existence. The same locales remained used for both everyday practices as well as for the interment of the dead. The Late Mesolithic in this region might have been a period during which long-distance connections were re-established with remote areas of the Balkans and probably beyond. This is primarily based on the reappearance of certain species of marine gastropods, which in the course of the 7th millennium at several sites in the Danube Gorges were used as body decoration along side with the local type of ornaments – appliqués made of Cyprinidae pharyngeal teeth, which are unique to this region. Rectangular stone-lined hearths were found at many sites, while the evidence of more elaborate dwellings with reddish floors comes from Vlasac. Knapped stone and osseous industries as well as the patterns of habitation found at the sites of Vlasac and Schela Cladovei are probably the most representative of the period. At both of these sites burials were found with embedded bone points, indicating violent deaths from feuding incidents. One of the burial norms during this period became extended supine inhumations found parallel to the Danube and frequently oriented with their heads pointing in the downstream direction.

Such burial practices continue in the period after around 6300 cal BC along with the tradition of rectangular stone-lined hearths. It seems that Lepenski Vir, after the period of abandonment in the Late Mesolithic, was reoccupied around 6200 BC with the evidence of flourishing building activity that constructed numerous trapezoidal buildings with reddish limestone floors at this site. Such an elaboration of the building space around rectangular hearths must have been related to the positioning of Lepenski Vir in the landscape of the Upper Gorge of the Danube, directly across from the trapezoidal Treskvaca Mountain. The special nature of the site is also underlined by the presence of a large number of sculpted boulders, some of which might have represented reifications of local myths and beliefs by depicting hybrid human-fish beings. At this time, Early Neolithic communities show up in the archaeological record of the surrounding areas of the Balkans. New evidence from Vlasac indicates that, whilst the burial tradition remained faithful to the Late Mesolithic canons, the body decoration changes in the period after 6200 cal BC, with the first appearance of Spondylus and stone ovoid-shaped beads as well as ›Neolithic-looking‹ red and white limestone discoid-shaped beads. Similar examples of body ornaments in burials are now dated to the same period at Lepenski Vir. Starčevo type pottery was found in association with trapezoidal buildings at Lepenski Vir along with various other typically Neolithic items of material culture (e. g. polished stone axes and the so-called ›Balkan‹ flint). The period is here referred to as Transformation/Early Neolithic, accommodating both changes affecting communities in the Danube Gorges as well as the historical context of Early Neolithic existence in the surrounding regions.

A more consolidated Neolithic presence in the region, with the abandonment of most of the trapezoidal buildings at Lepenski Vir and the appearance of domestic animals and domed ovens, amongst other elements of Neolithic existence, starts from around 5950/5900 BC, the period that is here designated as the Middle Neolithic. Different from Lepenski Vir, at Padina, the tradition of trapezoidal buildings used for domestic purposes might have continued into this period. Most of the burials dated to this period come from Lepenski Vir, and the dominance of crouched/flexed inhumations represents a major change in relation to the Late Mesolithic burial pattern of extended supine inhumations. A number of burials found as crouched inhumations at Lepenski Vir and, at this time, the newly established site of Ajmana were migrants. The consumption of fish was still significant during this period, but there is both isotopic and dental evidence suggesting changes in dietary practices on some of these individuals. In addition, characteristic Neolithic bone spoons were found at Schela Cladovei, perhaps suggesting the common practice of eating cereal-based food. Whilst most of the sites previously occupied in the course of the Epipalaeolithic or Mesolithic were also used during this period, there are newly established sites both along the Danube (Ajmana, Ušće kameničkog potoka, Knjepište[178]) and on the hills in the immediate hinterland of Lepenski Vir (the recently investigated site of Aria Babi). This seemingly high visibility of sites during this period, at face value, may indicate a larger number of people than during the previous periods coupled with important changes in patterns of habitation in the region.

After 5500 BC, these locales along the Danube that had been used for millennia were completely ignored by fully agricultural Late Neolithic Vinča communities found in the surrounding areas. Only later, Eneolithic pastoralist groups appear again in the archaeological record of these old locales. While no existing archaeological evidence indicates a continuation of locally grounded knowledge of these places for specialized fishing, developed over several millennia of forager existence in the region, the significance of many of these locales for fishing was rediscovered in later times, documented in ethnographic and historical accounts.

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178 Stanković 1986a; Stanković 1986b.

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Appendix 1 Conventional and AMS dated human burials in the Danube Gorges. Ages are corrected for those dates that have $\delta^{15}N$ values >+10 ‰ (affected by the aquatic reservoir effect), using Method 2 as suggested by Cook et al. (2002) and calibrated with OxCal v. 4.0.5 (Bronk Ramsey 1995; Bronk Ramsey 2001). The $\delta^{15}N$ values used to estimate percentage of aquatic diet. a = 100 % reservoir correction applied (440 ± 45 years); b = 50 % reservoir correction applied (220 ± 23 years). Note that previous results on the burials from Padina and Hajdučka Vodenica published in Borić and Miracle (2004) are here replaced with the following dates: OxA-16937, -16938, -16939, -16940, -17144 and -17145 (all six from Padina) and OxA-13613, -16941, -16942 and -17146 (all four from Hajdučka Vodenica).

	Site/Lab Number	Context and material	^{14}C age (BP)	$\delta^{15}N$ (‰)	$\delta^{13}C$ (‰)	68.2 % probabilty (cal. BC)	95.4 % probability (cal. BC)	Sources
Ajmana								
1	AA-58322	Burial 7, human skull	7219 ± 51	10.0	–20.0	6204–6192	6214–6008	Borić and Price forthcoming
2	AA-58323	Burial 6, human skull	7065 ± 48	10.5	–20.0	6000–5901	6030–5842	Borić and Price forthcoming
Alibeg								
1	Bln-1193	**Horizon II, S. II, charcoal**	7195 ± 100	–	–	6210–5988	6336–5846	Boroneanț 2000:203
Băile Herculane								
1	GrN-16987	**Charcoal**	11.490 ± 75	–	–	11.466–11.326	11.559–11.215	Păunescu 2000:342
Cuina Turcului								
1	Bln-803	Layer I, depth 5.9–5.95 m, charcoal of Pinus sp. from a hearth at the base of the layer	12.600 ± 120	–	–	13.180–12.602	13.296–12.193	Păunescu 2000:342
2	Bln-804	Layer I, depth 6.2–6.4 m, charcoal of Pinus sp. from a hearth at the base of the layer	12.050 ± 120	–	–	12.086–11.824	12.289–11.546	Păunescu 2000:342
3	GrN-12665	Layer I, depth 6.2–6.4 m, charcoal of Pinus sp. from a hearth at the base of the layer	11.960 ± 60	–	–	11.943–11.796	12.040–11.707	Păunescu 2000:342
4	Bln-802	Layer II, depth 3.68–3.85 m, wood charcoal of Pinus sp. and burned bone from a hearth at the base of the layer	10.125 ± 200	–	–	10.110–9402	10.565–9262	Păunescu 2000:342
Hajdučka Vodenica								
1	OxA-13613 replaces OxA-11128	Burial 8, human skull, older hearth, Trench 15b	8456 ± 37* Corrected: 8016 ± 58[a]	16.39	–18.7	7058–6828	7076–6699	Unpublished; see Borić and Miracle 2004
2	AA-57774	Burial 29, human canine (33), Trench 16c	8151 ± 60* Corrected: 7711 ± 75[a]	16.0	–20.0	6602–6471	6680–6434	Borić and Price forthcoming
3	OxA-17146 replaces OxA-11127	Burial 12, human skull, floor of the 'sacrificial hearth' area, Trench 15b	7835 ± 43* Corrected: 7395 ± 62[a]	16.05	–18.5	6372–6222	6410–6096	Unpublished; see Borić and Miracle 2004
4	OxA-16941 replaces OxA-11109	Burial 20, human skull, 'grave chamber'	7784 ± 44* Corrected: 7340 ± 63[a]	16.6	–18.0	6326–6090	6368–6068	Unpublished; see Borić and Miracle 2004
5	OxA-16942 replaces OxA-11126	Burial 15-'younger', human skull, 'grave chamber', Trench 16b	7755 ± 44* Corrected: 7315 ± 63[a]	15.98	–18.9	6230–6090	6361–6050	Unpublished; see Borić and Miracle 2004
6	AA-57773	Burial 13, human skull, Trench 15c	7435 ± 70* Corrected: 6995 ± 83[a]	15.8	–20.3	5982–5795	6016–5726	Borić and Price forthcoming
Icoana								
1	AA-65564	Depth 1.4 m, pig bone	9403 ± 93	–	–	8816–8494	9130–8350	Dinu et al. 2007
2	AA-67748	Depth 0.6 m, pig bone	9247 ± 89	–	–	8566–8332	8706–8287	Dinu et al. 2007
3	AA-65558	Depth 0.9 m, pig bone	9196 ± 89	–	–	8536–8300	8632–8265	Dinu et al. 2007

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
4	AA-66586	Depth 1.55 m, pig bone	9101 ± 87	–	–	8448–8242	8570–7991	Dinu et al. 2007
5	AA-67750	Depth 1.3 m, pig bone	9044 ± 88	–	–	8421–7997	8533–7960	Dinu et al. 2007
6	AA-65565	Depth 1.6 m, pig bone	8989 ± 88	–	–	8291–7982	8421–7822	Dinu et al. 2007
7	AA-65556	Depth 1.9 m, pig bone	8966 ± 87	–	–	8279–7980	8307–7796	Dinu et al. 2007
8	AA-65560	Depth 1.1 m, pig bone	8955 ± 73	–	–	8271–7982	8294–7841	Dinu et al. 2007
9	AA-65566	Depth 1.65 m, pig bone	8952 ± 88	–	–	8274–7971	8299–7794	Dinu et al. 2007
10	AA-65554	Depth 1.7 m, pig bone	8913 ± 87	–	–	8237–7963	8281–7760	Dinu et al. 2007
11	AA-65562	Depth 1.2 m, pig bone	8907 ± 98	–	–	8248–7942	8286–7742	Dinu et al. 2007
12	AA-66377	Depth 2.1 m, pig bone	8855 ± 93	–	–	8207–7832	8254–7679	Dinu et al. 2007
13	AA-65559	Depth 1 m, pig bone	8840 ± 86	–	–	8202–7816	8242–7679	Dinu et al. 2007
14	AA-65561	Depth 1.15 m, pig bone	8729 ± 79	–	–	7937–7607	8180–7588	Dinu et al. 2007
15	AA-66369	Depth 0.4 m, pig bone	8702 ± 86	–	–	7935–7596	8176–7578	Dinu et al. 2007
16	AA-65547	Depth 0.5 m, pig bone	8648 ± 83	–	–	7780–7582	7950–7544	Dinu et al. 2007
17	Bln-1078	Horizon Ib S IV, depth 2.1 m, charcoal	8605 ± 250	–	–	8182–7376	8295–7076	Boroneanț 2000:204
18	AA-65551	Depth 1.95 m, pig bone	8575 ± 83	–	–	7703–7532	7935–7476	Dinu et al. 2007
19	Bln-1077	Horizon Ia S IV, depth 0.5 m, charcoal	8265 ± 100	–	–	7457–7177	7518–7071	Boroneanț 2000:204
20	Bonn 2	Horizon Ia, S. II, depth 1.6 m, charcoal	8070 ± 130	–	–	7246–6772	7448–6649	Boroneanț 2000:203
21	Bonn 3	Horizon Ib, S. II, depth 1.2 m, charcoal	8010 ± 120	–	–	7071–6700	7309–6634	Boroneanț 2000:203
22	Bonn 4	Horizon Ib, S. II, depth 2 m, habitation pit, charcoal	7660 ± 110	–	–	6631–6427	6754–6248	Boroneanț 2000:203
23	AA-66368	Depth 0.3 m, human bone	7604 ± 76‡	–	–	6563–6396	6606–6260	Dinu et al. 2007
24	Bln-1056	Horizon III (Criş hut), charcoal	7445 ± 80	–	–	6395–6240	6456–6100	Boroneanț 2000: 204
25	AA-65563	Depth 1.25 m, pig bone	7245 ± 62	–	–	6211–6052	6229–6010	Dinu et al. 2007
26	Bonn 1	Horizon II, S. III, depth 1 m charcoal	5830 ± 120	–	–	4832–4542	4996–4403	Boroneanț 2000:203
Lepenski Vir								
1	OxA-16072	Beneath the floor of Building 47', red deer right M_2 (LV12, 1315a) (09/10/1970)	9850 ± 50	7.8	–20.2	9332–9258	9441–9241	Borić and Dimitrijević 2009
2	OxA-16076	Floor of Building 54, red deer antler (LV30) (October 1967)	9750 ± 45	6.1	–19.6	9280–9220	9298–9150	Borić and Dimitrijević 2009
3	OxA-16004	Between the floors of Buildings 47 and 47', floor of Building 47', red deer metatarsus (LV10, 1314a) (09/10/1970)	9730 ± 50	6.0	–20.3	9272–9184	9294–8926	Borić and Dimitrijević 2009
4	OxA-11715†	Burial 60, right or left human femur	9470 ± 55* Corrected: 9030 ± 71[a]	15.5	–18.9	8312–8010	8431–7964	Bonsall et al. 2008
5	OxA-16071	Building 26' – floor, red deer modified antler (LV6, bb-33) (31/08/1970)	8855 ± 40	6.2	–21.4	8203–7940	8216–7817	Borić and Dimitrijević 2009
6	OxA-8610	Beneath the floor of Building 23, large-size ungulate long bone (1299c)	8770 ± 60	4.7	–21.6	7956–7716	8181–7605	Whittle et al. 2002

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2 % probabilty (cal. BC)	95.4 % probability (cal. BC)	Sources
7	OxA-11703†	Burial 69, left human femur	9180 ± 50* Corrected: 8740 ± 67[a]	14.6	–19.2	7938–7614	8170–7594	Bonsall et al. 2008
8	OxA-16074	Hearth a, shed red deer antler (LV22, 268/1) (02/10/1967)	8645 ± 40	5.9	–20.3	7678–7593	7740–7587	Borić and Dimitrijević 2009
9	AA-57781	Burial 22, human mandible, next to Hearth a	8814 ± 60* Corrected: 8374 ± 75[a]	14.4	–20.0	7526–7354	7580–7190	Borić and Price forthcoming
10	OxA-11698†	Burial 61 interred through the floor of Building 40, human right femur	7860 ± 50* Corrected: 7420 ± 67[a]	16.1	–18.8	6374–6234	6432–6101	Bonsall et al. 2008
11	KN-405	Building 62, charcoal (possibly *Quercus* sp.) timber beam over the building hearth	7430 ± 160	–	–	6440–6101	6595–6005	Quitta 1975; Borić 2002a
12	OxA-11704†	Burial 14, human right femur	7830 ± 45* Corrected: 7390 ± 64[a]	15.7	–18.6	6376–6216	6401–6091	Bonsall et al. 2008
13	OxA-11696†	Burial 54c, human left femur, Building 65/XXXVI	7610 ± 45* Corrected: 7390 ± 51[b]	12.4	–19.6	6364–6222	6396–6097	Bonsall et al. 2008
14	OxA-8725	Buildings 20 and 33 – between the floors, on the floor of Building 20 in corner D, fish vertebra	7600 ± 90* Corrected: 7380 ± 93[b]	9.7	–16.9	6378–6107	6426–6067	Wittle et al. 2002
15	OxA-11701†	Burial 45b, human left femur, floor of Building 61	7805 ± 50* Corrected: 7365 ± 67[a]	15.8	–18.5	6359–6103	6388–6076	Bonsall et al. 2008
16	OxA-11697†	Burial 54e, human left femur, Building 65/XXXVI	7550 ± 45* Corrected: 7330 ± 51[b]	13.0	–19.1	6236–6098	6356–6064	Bonsall et al. 2008
17	Bln-740b	Building 36 beneath the floor of Building 35, charcoal (*Quercus* sp.) timber beam (LV13/68)	7360 ± 100	–	–	6357–6098	6426–6050	Quitta 1975; Borić 2002a
18	Bln-740a		7310 ± 100	–	–	6331–6058	6392–6011	Quitta 1975; Borić 2002a
19	OxA-11705†	Burial 79a, human scapula, square e/4, spits 11–13	7780 ± 50* Corrected: 7340 ± 67[a]	15.8	–18.6	6328–6089	6372–6066	Bonsall et al. 2008
20	OxA-X-2176–19	LV26, red deer metacarpus from the rear area of the floor of Building 65/XXXVI (1329a) (30/09/1970)	7314 ± 40	6.5	–20.7	6226–6101	6240–6070	Borić and Dimitrijević 2009
21	OxA-16084	Building 4 – floor, bone tool (inv. 349), large mammal bone	7285 ± 37	6.9	–21.2	6212–6092	6226–6068	Borić and Dimitrijević 2009
22	OxA-X-2176–18	Building 24 – around the hearth, red deer right $M_{1/2}$ (LV24, 1300a) (02/09/1970)	7285 ± 45	7.0	–21.5	6213–6090	6231–6060	Borić and Dimitrijević 2009
23	OxA-15998	Buildings 20 and 33 – between the floors, on the floor of Building 20 in corner D, roe deer metacarpus (LV1, 1082) (30/08/1968)	7280 ± 45	7.9	–22.1	6212–6083	6231–6056	Borić and Dimitrijević 2009
24	KN-407	Building 54, charcoal possibly from the hearth	7280 ± 160	–	–	6354–6006	6452–5846	Quitta 1975; Borić 2002a

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
25	OxA-16001	Buildings 26 and 26' – between the floors, spit 1 below the floor of Building 26, red deer vertebra (LV5, 1320a) (29/08/1970)	7235 ± 40	5.5	–20.6	6206–6034	6212–6025	Borić and Dimitrijević 2009
26	OxA-16002		7160 ± 40	6.4	–20.1	6058–6004	6091–5926	Borić and Dimitrijević 2009
27	OxA-5827	Burial 31a, human left humerus, Pit 2, square a/VII	7770 ± 90* Corrected: 7230 ± 101[a]	15.7	–18.7	6212–6019	6361–5902	Bonsall et al. 1997
28	Bln-738	LV12/68, charcoal (*Quercus* sp.) from the hearth, Building 54	7225 ± 100	–	–	6212–6016	6355–5898	Quitta 1975; Borić 2002a
29	OxA-16077	Building 27 – floor, section above the rear part of the building, red deer D_4 (LV31, 1304a) (03/09/1970)	7225 ± 40	8.7	–24.4	6202–6026	6212–6016	Borić and Dimitrijević 2009
30	OxA-16081	Building 57/XLIV – stone construction above the floor of the building, bone tool (inv. 689, LV15) (05/10/1967)	7219 ± 37	6.3	–21.3	6201–6020	6210–6012	Borić and Dimitrijević 2009
31	KN-406	Building 27, charcoal probably from the hearth	7210 ± 200	–	–	6344–5889	6452–5724	Quitta 1975; Borić 2002a
32	OxA-8618	Building 51, floor of the rear area of the building, large-size ungulate long bone (1313a,c), beneath Building 57/XLIV	7200 ± 60	3.9	–21.2	6202–6004	6218–5986	Whittle et al. 2002
33	OxA-16078	Building 28 – floor, red deer skull (LV32, 273) (03/10/1967)	7191 ± 40	8.2	–21.4	6076–6012	6206–5989	Borić and Dimitrijević 2009
34	OxA-16005	Burial 122, human skull (LV11) between Buildings 47 and 47' (09/10/1970)	7190 ± 45	9.5	–19.5	6082–6006	6208–5987	Borić and Dimitrijević 2009
35	OxA-16006		7190 ± 40	9.3	–19.3	6075–6012	6206–5988	Borić and Dimitrijević 2009
36	OxA-16003	Buildings 35 and 36 – between the floors, in the hearth of Building 36, pig phalanx III (LV8, 1036) (23/08/1968)	7170 ± 40	7.0	–20.3	6062–6008	6198–5928	Borić and Dimitrijević 2009
37	OxA-16009	LV19, red deer mandible from the floor of Building 34 (517, 483) (18/10/1967)	7165 ± 40	7.9	–22.3	6061–6006	6100–5925	Borić and Dimitrijević 2009
38	OxA-16075	Building 22 – floor, red deer antler (LV28, 261) (August 1967)	7157 ± 39	6.2	–21.9	6057–6003	6084–5926	Borić and Dimitrijević 2009
39	OxA-11702†	Burial 89a, human tibia, next to section f	7595 ± 45* Corrected: 7155 ± 64[a]	15.7	–18.1	6078–5928	6210–5898	Bonsall et al. 2008
40	OxA-5830	Burial 44, human right humerus	7590 ± 90* Corrected 7150 ± 101[a]	15.3	–18.9	6202–5903	6232–5810	Bonsall et al. 1997
41	AA-57779	Burial 7/I-a, human rib, Building 21	7368 ± 74* Corrected: 7148 ± 77[b]	11.5	–18.9	6089–5916	6216–5884	Borić and Price forthcoming
42	OxA-11692†	Burial 7/I-a, human right femur, Building 21	7710 ± 50* Corrected: 7270 ± 67[a]	16.2	–18.1	6213–6072	6328–6007	Bonsall et al. 2008
43	OxA-12979†		7697 ± 38* Corrected: 7257 ± 59[a]	16.6	–17.5	6211–6064	6230–6018	Bonsall et al. 2008

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
44	OxA-16082	Building 37 – floor, bone tool (inv. 673) (LV20)	7138±37	5.9	–20.6	6048–5990	6071–5922	Borić and Dimitrijević 2009
45	OxA-16538	Burial 5, bone tool on an unfused epiphysis (inv. 552) (LV14, 11/07/1966)	7136±37	6.0	–21.4	6048–5988	6070–5922	Borić and Dimitrijević 2009
46	OxA-16073	Building 57/XLIV – floor, roe deer right M_2 (LV16, 558/1) (04/07/1968)	7125±40	6.5	–21.5	6048–5934	6068–5913	Borić and Dimitrijević 2009
47	AA-57782	Burial 26, human mandible, Building 34	7332±50* Corrected: 7112±55[b]	11.5	–26.5	6048–5920	6078–5880	Borić and Price forthcoming
48	OxA-11693†	Burial 26, human right tibia, Building 34	7380±45	9.6	–20.1	6361–6216	6383–6096	Bonsall et al. 2008
49	OxA-15999	Building 32 – floor, red deer right proximal metatarsus (LV2, 1090/4) (1968)	7111±40	5.4	–20.8	6026–5924	6061–5902	Borić and Dimitrijević 2009
50	OxA-16010	Burial 94 beneath Building 24, human neonate short bone from articulated (LV25) (15/10/1970)	7520±40* Corrected: 7080±64[a]	19.5	–18.1	6016–5898	6068–5811	Borić and Dimitrijević 2009
51	AA-57780	Burial 7/II-b, human skull in Burial 7/I-a, Building 21	7512±71* Corrected: 7072±84[a]	16.0	–20.0	6026–5848	6080–5746	Borić and Price forthcoming
52	OxA-16000	Building 26 – floor, red deer skull, square A/VI (LV4, 143) (22/07/1967)	7070±40	6.7	–21.5	6002–5910	6023–5849	Borić and Dimitrijević 2009
53	OxA-16083	Building 5 – floor, bone tool (inv. 125) (LV33, 12/08/1965)	7059±36	6.0	–20.7	5990–5902	6014–5849	Borić and Dimitrijević 2009
54	AA-57783	Burial 54d, human skull, Building 65/XXXVI	7494±51* Corrected: 7054±68[a]	15.1	–20.0	6008–5880	6055–5781	Borić and Price forthcoming
55	OxA-11700†	Burial 54d, human left femur, Building 65/XXXVI	7785±45* Corrected:	15.2	–17.7	6332–6092	6371–6070	Bonsall et al. 2008
56	OxA-16007	Building 8, stone construction above the building (spit 7), bone tool (inv. 336) (LV13, 08/07/1966)	7050±40	5.2	–21.1	5986–5901	6010–5845	Borić and Dimitrijević 2009
57	OxA-5828	Burial 32, human left femur	7270±90* Corrected: 7050±93[b]	11.9	–19.5	6018–5840	6076–5731	Bonsall et al. 1997
58	OxA-16213	Square c/I, spit 7, domestic cattle proximal metatarsus, (LV39, unit 905a) (01/08/1968)	7043±37	8.3	–21.5	5984–5899	6002–5845	Borić and Dimitrijević 2009
59	OxA-16212	Domed oven, square d/3, spit 6, goat proximal metacarpus (LV37, 831a) (26/07/1968)	7041±35	6.8	–19.8	5983–5898	6000–5845	Borić and Dimitrijević 2009
60	BIn-653	Building 54 – from a timber beam in corner A underneath a stone, charcoal (*Quercus* sp.) (LV9/67)	7040±100	–	–	6014–5811	6085–5720	Quitta 1975; Borić 2002a
61	OxA-16079	Pit 1, square a/VII, spit 9, pig scapula (LV35, 665) (12/07/1968)	7037±39	9.3	–20.2	5984–5893	6005–5841	Borić and Dimitrijević 2009
62	OxA-16211	Pit 3, square a/VIII, spit 9, domestic cattle horncore (LV36, 674) (15/07/1968)	7021±36	6.7	–21.1	5982–5880	5996–5811	Borić and Dimitrijević 2009

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
63	OxA-16253	Square C/XVI, spit 3, goat mandible (LV38) (16/08/1968)	7008±38	7.1	–20.7	5977–5846	5988–5798	Borić and Dimitrijević 2009
64	OxA-16008	Burial 19, human unfused humerus, Building 57/XLIV (LV17)	7205±40* Corrected: 6985±46[b]	10.2	–18.6	5974–5810	5984–5752	Borić and Dimitrijević 2009
65	Z-115	Building 54, corner A, charcoal from timber beam	6984±94	–	–	5980–5771	6031–5676	Quitta 1975; Borić 2002a
66	UCLA-1407	Building 47, along the left side, charcoal from a timber beam	6970±60	–	–	5970–5777	5984–5736	Quitta 1975; Borić 2002a
67	OxA-11695†	Burial 9, human left femur, Building 24	7150±45* Corrected: 6930±51[b]	10.8	–19.4	5874–5741	5973–5720	Bonsall et al. 2008
68	OxA-16537	Burial 7, Building 21, red deer skull (LV9, 524) (20/10/1967)	6924±37	7.7	–21.9	5840–5748	5888–5728	Borić and Dimitrijević 2009
69	OxA-5831	Burial 88, human femur or left tibia (?)	7130±90* Corrected: 6910±93[b]	10.9	–20.2	5895–5714	5984–5644	Bonsall et al. 1997
70	OxA-5829	Burial 35, human long bone (?)	6910±90* Corrected: 6690±93[b]	11.2	–19.7	5701–5530	5748–5475	Bonsall et al. 1997
71	Bln-678	Building 37 – floor, charcoal (*Quercus* sp.) from a large timber beam (LV5/67)	6900±100	–	–	5894–5676	5984–5636	Quitta 1975; Borić 2002a
72	BM-379		6900±150	–	–	5971–5666	6060–5544	
73	Bln-575	Building 1 – floor, south-east area of the building, between 2 stone slabs, charcoal (*Quercus* sp.) (LV1/66)	6860±100	–	–	5844–5658	5982–5574	Quitta 1975; Borić 2002a
74	Bln-647	Building 8 – floor, charcoal (*Quercus* sp.) from a timber beam (LV3/67)	6845±100	–	–	5836–5644	5980–5565	Quitta 1975; Borić 2002a
75	AA-58319	Burial 8, Building 24, human skull (bag 263)	6825±51* Corrected: 6605±56[b]	10.2	–21.2	5744–5659	5832–5630	Borić and Price forthcoming
76	OxA-11694†	Burial 8, Building 24, human left femur	7050±45	9.8	–19.7	5988–5897	6016–5841	Bonsall et al. 2008
77	Bln-576	Building 16 – floor, thin layer of charcoal (*Quercus* sp.) (LV2/66)	6820±100	–	–	5806–5628	5973–5556	Quitta 1975; Borić 2002a
78	Bln-650	Building 34 – floor, beneath the floor of Building 43, charcoal (*Quercus* sp.) from a timber beam (LV6/67)	6820±100	–	–	5806–5628	5973–5556BC	Quitta 1975; Borić 2002a
79	P-1598	Building 32 – hearth, charcoal	6814±69	–	–	5748–5636	5872–5571	Quitta 1975; Borić 2002a
80	Bln-649	Building 37 – floor, charcoal (*Quercus* sp.) from a large timber beam (LV5/67)	6800±100	–	–	5794–5620	5963–5529	Quitta 1975; Borić 2002a
81	AA-58320	Burial 17, human skull	7007±48* Corrected: 6787±53[b]	10.9	–20.0	5718–5644	5776–5575	Borić and Price forthcoming
82	Bln-654	Building IX – infill of Building 37, charcoal (*Quercus* sp.) (LV10/67)	6630±100	–	–	5629–5486	5725–5378	Quitta 1975; Borić 2002a

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
83	Bln-652	Building 51 – floor, along its left side, charcoal (*Ulmus* sp.) from a timber beam (LV8/67)	6620±100	–	–	5626–5484	5720–5376	Quitta 1975; Borić 2002a
84	Bln-655	Building XXXII – infill of Building 48, charcoal (*Quercus* sp.) (LV11/67)	6560±100	–	–	5621–5390	5658–5325	Quitta 1975; Borić 2002a
85	OxA-11719†	Burial 2, human right femur	5425±50	10.6	–19.5	4336–4246	4361–4070	Bonsall et al. 2008
86	OxA-11716†	Burial 18, human left ulna	1874±40	10.5	–18.4	AD 78–210	AD 56–237	Bonsall et al. 2008
87	OxA-11699†	Burial "4"1, human left fibula	485±31	9.2	–18.2	AD 1419–1452	AD 1404–1452	Bonsall et al. 2008
88	OxA-11717†	Burial 30, human right humerus	477±34	10.3	–18.4	AD 1419–1445	AD 1402–1464	Bonsall et al. 2008
89	OxA-11706†	Burial 29, human left femur	445±31	9.4	–18.4	AD 1428–1458	AD 1415–1487	Bonsall et al. 2008
90	OxA-11718	Burial 62, human right femur or right tibia	445±63	9.3	–18.5	AD 1410–1616	AD 1326–1635	Bonsall et al. 2008
Ostrovul Banului								
1	AA-66370	Depth 0.4m, pig bone	8219±87	–	–	7342–7083	7478–7060	Dinu et al. 2007
2	Bln-1080	Horizon III S I, hearth 1, charcoal	8040±160	–	–	7174–6698	7455–6595	Boroneanț 2000:203
3	Bln-1079	Horizon III S IV, hearth 2, charcoal	7565±100	–	–	6504–6261	6606–6228	Boroneanț 2000:203
Ostrovul Corbului								
1	SMU-587	Niveau I – lower part, Section I, quad. 1a, depth 4.5–4.53m, charcoal and burned bones from a hearth (1/1977)	8093±237	–	–	7340–6700	7572–6506	Păunescu 1996:179
2	SMU-588	Niveau II – middle, Section I, quad. 1a, depth 4.02–4.12m, charcoal and burned bones from a hearth (2/1977)	7827±237	–	–	7032–6475	7354–6233	Păunescu 1996:179
3	Bln-2135	Niveau I – lower part, Section XII, quad. 5c–4c, depth 4.2–4.38m, charcoal and burned bones from a hearth (3/1978)	7710±80	–	–	6606–6468	6696–6420	Păunescu 1996:179
4	Bln-2135A		7659±80	–	–	6589–6446	6650–6389	Păunescu 1996: 179
5	Grn-12675	Niveau I, Section XIIa, quad. 1a-b, depth 4.23m, charcoal (4/1979)	7640±80	–	–	6588–6433	6648–6370	Păunescu 1996: 179
Ostrovul Mare								
1	AA-66379	Depth 1.7 m, pig bone	7890±78	–	–	7020–6644	7041–6601	Dinu et al. 2007
Padina								
1	OxA-17144 replaces OxA-11102	beneath Building 14, red deer astragalus (8.70/377/5)	9737±49	5.6	–23.6	9276–9192	9296–8934	Unpublished; see Borić and Miracle 2004
2	AA-57771	Burial 9, human skull, Sector III	9920±100* Corrected 9480±110[a]	15.5	–20.7	9120–8634	9221–8548	Borić and Price forthcoming
3	OxA-16939 replaces OxA-11106	Burial 21, human rib, in the stone construction, Sector III	9804±49* Corrected: 9364±67[a]	14.5	–19.0	8734–8558	8810–8352	Unpublished; see Borić and Miracle 2004

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
4	BM-1146	Burial 12, human bone, Sector III	9331 ± 58‡	–	–	8704–8486	8753–8351	Burleigh and Živanović 1980; see Borić and Miracle 2004
5	OxA-16938 replaces OxA-11104	Burial 11, human rib, beneath Building 15, Sector III	9665 ± 54* Corrected: 9225 ± 70[a]	13.7	–19.2	8542–8334	8616–8296	Unpublished; see Borić and Miracle 2004
6	BM-1404	Burial 39 (?)2, human bone	9292 ± 148‡	–	–	8709–8320	9126–8245	Burleigh and Živanović 1980; see Borić and Miracle 2004
7	BM-1147	Burial 14, human bone, Sector III	9198 ± 103‡	–	–	8542–8299	8703–8246	Burleigh and Živanović 1980; see Borić and Miracle 2004
8	OxA-17145 replaces OxA-11105	Burial 15, human trapezium	9310 ± 44* Corrected: 8870 ± 63[a]	14.4	–19.1	8210–7945	8237–7761	Unpublished; see Borić and Miracle 2004
9	BM-1144	Burial 7, human bone, Sector II	8797 ± 83‡	–	–	8171–7726	8208–7613	Burleigh and Živanović 1980; see Borić and Miracle 2004
10	OxA-9055	Midden, Sector III, profile 3 segm. 1, spit 3, red deer mandible (7.70/191/1)	8445 ± 60	4.7	–20.8	7575–7486	7590–7356	Whittle et al. 2002; Borić and Miracle 2004
11	AA-57772	Burial 27, human skull, block 5d, Sector II	8420 ± 120* Corrected: 7980 ± 128[a]	15.4	–20.9	7051–6699	7306–6590	Borić and Price forthcoming
12	BM-1403	Sector III, bear bone	8138 ± 121	–	–	7349–6845	7480–6710	Burleigh and Živanović 1980; see Borić and Miracle 2004
13	OxA-9034	Above Building 12, dog tibia (8.70/289/15) – under the level with animal bones, Sector III	7755 ± 65	8.6	–17.7	6642–6506	6735–6456	Whittle et al. 2002; Borić and Miracle 2004
14	BM-1143	Burial 2, human Sector I	7738 ± 51‡	–	–	6630–6504	6648–6470	Burleigh and Živanović 1980; see Borić and Miracle 2004
15	OxA-16940 replaces OxA-11108	Burial 1a, antler tool in burial, Sector I	7707 ± 44	6.7	–21.0	6591–6496	6633–6464	Unpublished; see Borić and Miracle 2004
16	OxA-11107	Burial 1a, human long bone, Sector I	7975 ± 50* Corrected: 7535 ± 67[a]	15.5	–17.9	6462–6270	6494–6239	Borić and Miracle 2004
17	OxA-9053	Beneath Building 18, dog ulna (8.70/358/1), Sector III	7685 ± 60* Corrected: 7465 ± 64[b]	11.3	–17.7	6402–6254	6443–6226BC	Whittle et al. 2002; Borić and Miracle 2004
18	OxA-9056	Building 9 – floor, dog tibia (8.70/347/1), Sector III	7625 ± 55* Corrected:	12.5	–18.1	7405 ± 60[b]	6366–6230 6420–6100	Whittle et al. 2002; Borić and Miracle 2004
19	AA-57770	Burial 5, human skull, Sector I	7598 ± 72* Corrected: 7158 ± 85[a]	16.6	–19.7	6202–5918	6224–5878	Borić and Price forthcoming
20	AA-57769	Burial 4, human skull, Sector I	7518 ± 72* Corrected: 7078 ± 85[a]	15.9	–19.1	6012–5901	6061–5841	Borić and Price forthcoming
21	GrN-8230	Occupation layer (?), charcoal	7100 ± 80	–	–	6051–5898	6204–5781	Clason 1980; Groningen Database

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
22	OxA-16937 replaces OxA-11103	Building 17 – hearth, mammal bone – projectile point, Sector III	7098±43	8.0	–22.8	6020–5918	6052–5895	Unpublished; see Borić and Miracle 2004
23	GrN-7981	A trapezoidal building (?), charcoal	7075±50	–	–	6009–5903	6048–5845	Clason 1980; Groningen Database
24	Minessota (?) in 1974	Building 8, charcoal from the floor, Sector III	7065±110	–	–	6052–5838	6206–5726	Jovanović 2008: 303
25	OxA-9052	Building 18 – floor, red deer antler (7.70/169/1), Sector III	6965±60	6.6	–22.2	5966–5768	5983–5732	Whittle et al. 2002; Borić and Miracle 2004
26	OxA-9054	Building 15 – beneath the floor level, mammal bone (modified bone 8.70/kuća 15/1), Sector III	6790±55	5.7	–21.5	5721–5644	5786–5575	Whittle et al. 2002; Borić and Miracle 2004
27	GrN-8229	A trapezoidal building's hearth (?), charcoal	6570±55	–	–	5602–5480	5626–5390	Clason 1980; Groningen Database
Răzvrata								
1	AA-66378	Depth 2.1 m, pig bone	8971±86	–	–	8281–7982	8315–7818	Dinu et al. 2007
2	AA-65555	Depth 1.8 m, pig bone	8891±87	–	–	8236–7940	8272–7752	Dinu et al. 2007
3	Bln-1057	Horizon II, hut, charcoal	7690±70	–	–	6591–6470	6646–6432	Boroneanț 2000:204
Schela Cladovei								
1	OxA-4379	Burial M43, human bone, Area III	8550±105* Corrected: 8110±114[a]	16.0	–19.6	7314–6836	7451–6698	Boroneanț et al. 1999
2	OxA-9140	Area VI, bone artefact	8105±60	–	–	7185–6869	7314–6830	Bonsall 2008
3	OxA-9135	Area VI, bone artefact	8085±60	–	–	7178–6848	7302–6820	Bonsall 2008
4	OxA-9139	Area VI, bone artefact	8075±60	–	–	7172–6840	7294–6776	Bonsall 2008
5	OxA-4385	Burial M55, human bone, Area III	8510±105* Corrected: 8070±114[a]	15.0	–20.0	7183–6778	7346–6657	Boroneanț et al. 1999
6	OxA-9007	Burial ?, Area VI, human bone	?* Corrected: 8055±86	–	–	7138–6824	7296–6692	Bonsall 2008
7	OxA-4382	Burial M49, human bone	8490±110* Corrected: 8050±119[a]	15.4	–19.6	7171–6774	7336–6648	Boroneanț et al. 1999
8	OxA-9138	Area VI, bone artefact	8040±60	–	–	7072–6829	7165–6702	Bonsall 2008
9	OxA-4380	Burial M46, human bone, Area III	8460±110* Corrected: 8020±119[a]	14.9	–19.2	7078–6700	7313–6641	Boroneanț et al. 1999
10	OxA-9137	Area VI, bone artefact	8010±60	–	–	7056–6828	7072–6698	Bonsall 2008
11	OxA-9207	Bone artefact	8000±80	–	–	7057–6779	7129–6655	Bonsall 2008
12	OxA-9374	Bone artefact	7980±60	–	–	7042–6821	7056–6696	Bonsall 2008
13	OxA-4378	Burial M42, human bone, Area III	8415±100* Corrected: 7975±110[a]	15.4	–19.4	7047–6708	7182–6594	Boroneanț et al. 1999
14	OxA-4381	Burial M48, human bone, Area III	8400±115* Corrected: 7960±123[a]	15.8	–19.5	7042–6699	7284–6511	Boroneanț et al. 1999
15	OxA-9132	Area VI, bone artefact	7950±55	–	–	7028–6710	7045–6686	Bonsall 2008
16	OxA-8583	Burial excavated in 1995, human bone, Area VI	8380±80* Corrected: 7940±92[a]	15.0	–18.5	7028–6695	7066–6608	Bonsall 2008; Cook et al. 2002

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
17	OxA-8584	Bone point embedded in left innominate of skeleton 1995, Area VI	7915 ± 65	4.7	–21.5	7022–6661	7036–6648	Bonsall 2008; Cook et al. 2002
18	OxA-8585	Bone point adjacent to the skull of skeleton 1995, Area VI	7780 ± 75	4.5	–20.9	6679–6504	6908–6454	Bonsall 2008; Cook et al. 2002
19	OxA-9131	Area V, bone artefact	7925 ± 60	–	–	7022–6688	7034–6656	Bonsall 2008
20	OxA-9136	Area VI, bone artefact	7895 ± 55	–	–	6908–6648	7030–6640	Bonsall 2008
21	OxA-8581	Burial excavated in 1991, human bone, Area III	8330 ± 75* Corrected: 7890 ± 88[a]	15.1	–19.5	7022–6643	7052–6573	Bonsall 2008; Cook et al. 2002
22	OxA-8582	Bone point embedded in thoracic vertebra of skeleton 1991, Area III	7880 ± 290	9.4	–22.0	7140–6453	7520–6232	Bonsall 2008; Cook et al. 2002
23	OxA-8502	Burial 1967–1, human bone	8300 ± 60* Corrected: 7860 ± 75[a]	13.2	–18.6	6906–6598	7038BC–6532	Bonsall 2008; Cook et al. 2002
24	OxA-8579	Bone point embedded in thoracic vertebra of skeleton 1967–1	7790 ± 100	5.0	–20.6	6751–6478	7028–6452	Bonsall 2008; Cook et al. 2002
25	OxA-4383	Burial M50, human bone, Area III	8290 ± 105* Corrected: 7850 ± 114[a]	15.6	–19.6	7022–6590	7044–6483	Boroneanț et al. 1999
26	OxA-9143	Area VI, bone artefact	7825 ± 60	–	–	6768–6591	7022–6496	Bonsall 2008
27	OxA-8547	Burial-1967–2, human bone	8240 ± 60* Corrected: 7800 ± 75 [a]	13.9	–19.3	6734–6504	7022–6464	Bonsall 2008; Cook et al. 2002
28	OxA-8580	Bone point embedded in lumbar vertebra of skeleton 1967–2	7770 ± 240	6.1	–20.8	7028–6433	7332–6111	Bonsall 2008; Cook et al. 2002
29	OxA-8548	Burial excavated in 1996, human bone, Area VI	8200 ± 70* Corrected: 7760 ± 83[a]	15.3	–18.2	6652–6482	6904–6436	Bonsall 2008; Cook et al. 2002
30	OxA-8549	Bone point adjacent to prox. end of femur of skeleton 1996, Area VI	7905 ± 60	7.7	–20.4	7001–6653	7032–6644	Bonsall 2008; Cook et al. 2002
31	OxA-8550	Bone point between lowermost vertebra and left innominate of skeleton 1996, Area VI	7805 ± 70	4.7	–21.2	6735–6507	7002–6468	Bonsall 2008; Cook et al. 2002
32	OxA-9142	Area VI, bone artefact	7745 ± 60	–	–	6636–6506	6680–6464	Bonsall 2008
33	OxA-9209	Area VI, bone artefact	7720 ± 70	–	–	6606–6476	6680–6441	Bonsall 2008
34	OxA-9141	Area VI, bone artefact	7700 ± 60	–	–	6591–6478	6642–6452	Bonsall 2008
35	OxA-9205	Area VI, bone artefact	7570 ± 90	–	–	6505–6265	6594–6242	Bonsall 2008
36	Oxa-9208	Area VI, bone artefact	7530 ± 70	–	–	6460–6266	6494–6235	Bonsall 2008
37	OxA-9206	Area VI, bone artefact	7460 ± 75	–	–	6400–6250	6462–6112	Bonsall 2008
38	OxA-9355	Area VI, bone artefact	7100 ± 50	–	–	6026–5916	6065–5885	Bonsall 2008
39	OxA-9210	Area VI, bone artefact	7010 ± 80	–	–	5986–5812	6021–5732	Bonsall 2008
40	OxA-9356	Area VI, bone artefact	6900 ± 50	–	–	5837–5730	5896–5673	Bonsall 2008
41	OxA-9357	Area VI, bone artefact	6890 ± 60	–	–	5840–5720	5966–5661	Bonsall 2008
42	OxA-9597	Area VI, bone artefact	6880 ± 50	–	–	5836–5718	5881–5666	Bonsall 2008
43	OxA-9134	Bone artefact	6865 ± 55	–	–	5809–5676	5877–5644	Bonsall 2008
44	OxA-9385	Area VI, bone artefact	6770 ± 50	–	–	5710–5638	5740–5570	Bonsall 2008
45	OxA-9133	Bone artefact	6715 ± 55	–	–	5702–5564	5721–5538	Bonsall 2008
46	OxA-9358	Bone artefact	6695 ± 55	–	–	5662–5560	5714–5522	Bonsall 2008

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
Vlasac								
1	OxA-5824	Burial 72, human bone, square c/9, 2.57 m from the surface (64.23 m asl), along the longer side of Hearth 23, 30 cm below the level of the hearth	10.240 ± 120* Corrected: 9800 ± 130[a]	14.5	–19.3	9643–8920	9756–8804	Bonsall et al. 1997
2	OxA-16219	Dwelling 4 – floor (60.7 m asl), in square BC/V, red deer antler (VL47, my inv. 1808)	10.000 ± 45	6.7	–21.1	9655–9394	9756–9321	Borić et al. 2008
3	AA-57776	Burial 17, human scapula, square A/II, 0.72 m from the surface (63.67 m asl), in the bedrock	9353 ± 86* Corrected: 8913 ± 97[a]	15.1	–20.7	8250–7951	8286–7749	Borić and Price forthcoming; Borić et al. 2008
4	OxA-5822	Burial 51a, human bone, square A/18, 2.73 from the surface (63.83 m asl), buried in the virgin soil, beneath Hearth 19	8760 ± 110* Corrected: 8320 ± 120[a]	14.4	–19.1	7518–7190	7572–7082	Bonsall et al. 1997
5	OxA-16214	Dwelling 1 – floor, brown bear canine (VL40, my inv. 1797) square C/IV, spit 25	8055 ± 45	8.4	–19.5	7080–6836	7163–6818	Borić et al. 2008
6	OxA-21962	Context 314, x.23, spit 1, roe deer skull (S3/2009), Trench 1/2007	8050 ± 40	5.0	–23.0	7075–6840	7131–6823	Unpublished
7	OxA-16216	Dwelling 2 – floor, roe deer skull (VL43) floor of in square a/18, my inv. 1250	7970 ± 45	5.8	–22.1	7033–6821	7047–6699	Borić et al. 2008
8	OxA-16543	Dwelling 5, bone chisel, aurochs' metapodial (VL48, my inv. 1271), square D/I, II, C/II	7945 ± 40	7.2	–21.9	7026–6708	7034–6693	Borić et al. 2008
9	OxA-16221	Burial 72, wild boar tusk tool (VL51), on the same level and next to Hearth 23	7936 ± 40	7.0	–20.7	7022–6698	7033–6686	Borić et al. 2008
10	Bln-1050	Square C/III (Sonda A), spit 15, charcoal (1/70)	7935 ± 100	–	–	7028–6691	7082–6574	Borić et al. 2008
11	LJ-2047b	Square A/II, spit 14, charcoal	7930 ± 77	–	–	7025–6690	7048–6646	Borić et al. 2008
12	LJ-2047a	Square C/III, spit 22, charcoal	7925 ± 77	–	–	7025–6686	7049–6642	Borić et al. 2008
13	OxA-16218	Dwelling 3 – floor, red deer antler (VL46, my inv. 1802), square C/VI, B/VI	7912 ± 39	5.9	–22.5	6981–6681	7028–6651	Borić et al. 2008
14	OxA-16217	Dwelling 2 – beneath the floor, red deer antler tool (LV44, my inv. 1265), square a/17, spit 23	7850 ± 40	6.5	–22.4	6752–6636	6900–6593	Borić et al. 2008
15	Bln-1170	Dwelling 4, charcoal (3/71), square BC/V, spit 18	7840 ± 100	–	–	7000–6531	7036–6496	Borić et al. 2008
16	Bln-1171	Square d/5, spit 9, charcoal (4/71)	7830 ± 100	–	–	6899–6508	7030–6478	Borić et al. 2008
17	AA-58321	Burial 25, human skull, square C/V, 1.95 m from the surface (61.61 m asl)	8267 ± 56* Corrected: 7827 ± 72[a]	16.2	–20.0	6804–6534	7026–6481	Borić and Price forthcoming; Borić et al. 2008
18	OxA-18865	Burial H136, human right tibia (VL1/2008), Trench 3/2006 (20/07/2006)	8231 ± 36* Corrected: 7791 ± 58[a]	16.2	–18.5	6684–6530	6774–6472	Borić et al. 2008

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2% probabilty (cal. BC)	95.4% probability (cal. BC)	Sources
19	OxA-16541	Burial H2, human rib (VL42), Trench 1/2006 (10/04/2006)	8228±40* Corrected: 7788±60[a]	16.3	–18.2	6681–6530	6775–6470	Borić et al. 2008
20	OxA-16540	Context 118, x.1, bone projectile point (VL21), above the floor context 149 of Feature 12, Trench 3/2006 (18/07/2006)	7764±38	7.7	–22.1	6644–6531	6654–6484	Borić et al. 2008
21	OxA-5826	Burial 83, human bone, square a/1, 1.07 m from the surface (64.72 m)	8200±90* Corrected: 7760±100[a]	14.6	–19.1	6685–6470	7024–6430	Bonsall et al. 1997
22	AA-57777	Burial 31, human skull, square a/17, 2.64 m from the surface, spit 23 (64.04 m asl, 29/10/1970), next to the east side of Dwelling 2 and 20 cm below the floor level	8196±69* Corrected: 7756±82[a]	16.1	–20.7	6649–6483	6823–6436	Borić and Price forthcoming; Borić et al. 2008
23	OxA-16080	Beneath Hearth 16, red deer antler (VL49, my inv. 1328), dark, burned soil	7731±39	6.6	–20.6	6598–6504	6638–6479	Borić et al. 2008
24	OxA-16220		7720±38	6.6	–20.8	6593–6504	6634–6474	Borić et al. 2008
25	OxA-5823	Burial 54, human bone, square A/17, 1.92 m from the surface (64.27 m asl); beneath Hearth 17	8170±100* Corrected: 7730±110[a]	14.9	–19.1	6678–6454	7024–6394	Bonsall et al. 1997
26	OxA-20702	Burial H232, charred stone of Cornelian cherry in context 249 beneath the skeleton	7725±40	–	–22.78	6596–6502	6636–6476	Unpublished
27	OxA-20762	Burial H81, human femur – proximal dyaphisis, Trench 3/2006	8125±45* Corrected: 7685±64	14.0	–19.32	6590–6468	6639–6440	Unpublished
28	AA-57778	Burial 45, human skull, square A/17, 2 m from the surface (64.32 m asl)	8117±62* Corrected: 7677±77[a]	15.6	–19.5	6591–6462	6654–6411	Borić and Price forthcoming; Borić et al. 2008
29	Bln-1169	Square c/9, spit 14, charcoal (2/71)	7665±100	–	–	6601–6434	6744–6259	Borić et al. 2008
30	Bln-1052	Square b/18, spit 13, charcoal (3/70)	7610±100	–	–	6590–6394	6644–6250	Borić et al. 2008
31	AA-57775	Burial 6, human skull, square a/6, 1.77 m from the surface (63.96 m asl)	8012±84* Corrected: 7572±95[a]	16.4	–19.8	6558–6266	6600–6235	Borić and Price forthcoming; Borić et al. 2008
32	OxA-5825	Burial 24, human bone, square b/17, 1.7 m from the surface (65.74 m asl)	8000±100* Corrected: 7560±110[a]	14.7	–18.6	6504–6256	6640–6220	Bonsall et al. 1997
33	Z-267	Beneath Hearth 16 in square b/9	7559±93	–	–	6497–6264	6592–6236	Borić et al. 2008
34	Bln-1168	Square b/9, spit 6, charcoal (1/71)	7475±100	–	–	6427–6248	6496–6093	Borić et al. 2008
35	Bln-1054	Square A/III, spit 13, charcoal (5/70)	7440±100	–	–	6416–6229	6460–6085	Borić et al. 2008
36	OxA-16539	Context 40, x.8, Trench 3/2006, square 95/96 (20), large mammal bone (VL18) (30/05/2006)	7425±39	6.8	–21.7	6362–6246	6393–6229	Borić et al. 2008
37	OxA-16542	Burial H63, human rib (08/07/2006)	7701±39* Corrected: 7261±60[a]	17.0	–17.7	6212–6066	6232–6018	Borić et al. 2008

	Site/Lab Number	Context and material	^{14}C age (BP)	δ^{15}N (‰)	δ^{13}C (‰)	68.2 % probabilty (cal. BC)	95.4 % probability (cal. BC)	Sources
38	OxA-16544	Context 19, red deer skull (VL50) over Burial H53, Trench 3/2006 (22/04/2006)	7035 ± 40	6.8	–21.3	5984–5891	6006–5838	Borić et al. 2008
39	Z-262	Dwelling 1, charcoal, square C/III (Sonda A), spit 26 (4.1 m below the surface)	7000 ± 90	–	–	5984–5798	6032–5720	Borić et al. 2008
40	Bln-1051	Dwelling 1, charcoal (2/70), square C/III (Sonda A), spit 26	6915 ± 100	–	–	5964–5715	5988–5642	Borić et al. 2008
41	Bln-1051a		6790 ± 100	–	–	5786–5575	5893–5522	Borić et al. 2008
42	Bln-1053	Dwelling 2, charcoal (4/70), square a/18, spit 18	6865 ± 100	–	–	5868–5660	5983–5618	Borić et al. 2008
43	Bln-1014	Dwelling 2, charcoal, square a/18, spit 18	6805 ± 100	–	–	5799–5622	5966–5534	Borić et al. 2008
44	Z-268	Burial 11, charcoal in square a/6, spit 7	6713 ± 90	–	–	5711–5559	5762–5480	Borić et al. 2008
45	Z-264	Burial 54, charcoal, square A/17, spit 11	6335 ± 92	–	–	5465–5218	5480–5062	Borić et al. 2008

Early Neolithic Pottery from Blagotin, Central Serbia: A Use-Alteration Analysis

by Jasna Vuković

Abstract

Functional analyses of the Early Neolithic pottery assemblages from the Balkans are completely lacking. Detailed functional analysis of ceramic assemblage from structure 03 from Blagotin was conducted and use-alteration analysis yielded most important results. It was focused on identification, distribution and frequency of use-wear traces and surface accretion on the outer and inner surfaces of pottery. Results revealed that it was possible to determine basic functional classes of pottery: food processing, cooking and storage. Comparison of the results of use alteration and morphological analyses allowed a more elaborate division into functional classes: long- and short-term storage, food processing and different forms of cooking, such as boiling and parching of foods.

The archaeological site of Blagotin is located in the village of Poljna, 26 km north of Trstenik, in central Serbia. The site is situated on a gentle slope, with the hill of Blagotin on its north and the seasonal Blagotin brook on its south. Archaeological finds from Poljna were first mentioned at the beginning of 20th century[1]. Systematic excavations began in 1989 and it was established that Blagotin was a multi-layer site, with several layers belonging to several Prehistoric periods – from Early Neolithic to Iron Age[2].

Pottery finds from Blagotin are numerous. So far, the only published analysis of pottery finds has been conducted for the structure 03, but it seems that the situation is similar in the other structures. Analysis was conducted in several stages: the first stage involved putting the vessels together. Only seven intact vessels were found in this structure, but 38 more vessels were restored in the first stage of analysis. The distribution of fragments showed that fragments that could be joined together were scattered around the whole area of the structure 03 and through all excavated layers. It is possible that a pit dwelling, damaged by fire, was first abandoned then used as garbage pit. A total of 15.883 fragments and whole vessels have been analyzed[3].

Some Methodological Issues

Pottery analysis from structure 03 wouldn't be complete without functional analysis. Although a morphological analysis was conducted (i. e. analysis of dimensions and proportions – ratios between different morphological parameters: height, diameter, volume etc, as well as analyses of shape and wall curvature)[4], use alteration analysis yielded important conclusions. It was focused on identification, distribution and frequency of use-wear traces and surface accretion on outer and inner surfaces of pottery. Results revealed that it was possible to identify basic functional classes of pottery: food processing, and cooking and storage. Comparison of the results of use alteration and morphological analyses allowed a more elaborate division within functional classes: long- and short-term storage, different forms of cooking, such as boiling and parching, and vessels for individuals and groups to be served from and from which they could eat. Since use-wear traces are lacking on the vessels with the function of serving and consuming foods and liquids, this functional class is excluded from this study.

Use-wear traces were identified according to the works of David Hally and James Skibo[5]:

1) Surface attrition, defined as the removal or deformation of ceramic surfaces[6]. Basic division was established according to traces that were caused by mechanical damage of the pottery surface: abrasion processes during cooking, cleaning, storing and manipulating of pots. A different kind of damage, so-called surface pitting or surface erosion, was caused by non-abrasive processes, mainly chemical processes that ocurred within the contents of the vessel.
2) Surface accretion refers to carbon deposits in the interiors and soot on the exteriors of the vessels. Carbon deposits are caused by the combustion of organic material and the depositing of the carbonized matter into the porous walls. Distribution patterns of carbon deposits provide the means for more detailed divisions within the functional class of cooking vessels: heating food in the absence of water, as well as wet-mode cooking[7]. Soot deposits that accumulate on the exteriors of the vessels are by-product of fuel combustion[8] and their distribution provides information about how the pot was positioned over a fire and the manner of cooking.
3) Oxidation discoloration on the exteriors also shows how the pot was positioned over a fire. As Hally has pointed out, oxidized patches usually can be attributed to accidents that occur during vessel firing, but in case of cooking vessels color variation can be attributed to exposure to the cooking fire[9].

1 Васић 1906.
2 Vuković 2004; Nikolić – Zečević 2001.
3 Vuković 2004.
4 Vuković 2006.
5 Hally 1983; Hally 1986; Skibo 1992.
6 Skibo 1992, 106.
7 Skibo – Blinman 1999, 180 f.
8 Hally 1983, 7.
9 Hally 1983, 11.

Pottery Assemblage from Structure 03: Use-Wear Traces and Function

The major difficulty in use-alteration analysis of pottery finds from Blagotin is the fact that they are highly fragmented. Different kinds of use-wear traces occur on different parts of a vessel, so the analysis of incomplete pots or individual fragments would be insufficient, if not misleading. However, there is a considerable number of whole, as well as partly-reconstructed vessels. They probably don't represent a valid statistical sample, but they allow use-alteration analysis, as well as some considerations about food habits and activities related to food preparation and the manipulating of pots.

Class A1: Food Processing

A total of 10 vessels[10] from OB03 showed intensive surface pitting on the interior walls and base. Main characteristic of vessels with this kind of inner-wall use-alteration is that damage traces start about 2–3 cm below the rim and most damaged area is lower belly and the base (Fig. 1a–b). Carbon deposits and sooting clouds are lacking. These vessels were completely worn out – some bases are so heavily damaged they aren't preserved at all – so the conclusion is that they were discarded in the garbage pit because they weren't suitable for any secondary use. Vessels with this kind of use alteration are, as a rule, open vessels, hemispherical or deep conical bowls of similar dimensions (rim diameter 18–25 cm, volume 3–5 l and height 12–16 cm). They usually have traces of mechanical damage on the exteriors, which means that they were handled and moved a lot. Since all kinds of surface accretion are lacking, it is clear that they were used for food preparation not involving heating, such as the soaking of cereals. It is known that production of highly acidic food results in the erosion of the inner walls of the vessel, so it is very possible that chemical processes like fermentation or even brewing occured[11].

Class A2: Cooking

Cooking vessels are identified by the presence of carbon deposits, sooting clouds and oxidized patches on the vessel's walls. This kind of use-wear traces seems lacking in the majority of vessels called ›cooking pots‹ in traditional typology[12]. However, open vessels, i.e. bowls of different dimensions, fabric and surface finishing, show different kinds of surface accretions and their distributional patterns.

Class A2/1: Wet-mode Cooking

Several larger open bowls were obviously used for the cooking of food over a fire. The best example is a hemispherical bowl (volume 4.3 l, height 25 cm, rim diameter 24 cm) with intensive carbon deposits on the whole interior except base (Fig. 2a). Moreover, sooting clouds are also present on the exteriors, in a zone below the rim and in the upper part (Fig. 2b). This means that the vessel was not used on an open fire, but raised above it. On the interiors abraded marks are also present. They may have been caused by abrasive action during washing, but it is more likely that they were caused by stirring the contents with some kind of utensil.

As noted above, a majority of larger, S-profiled vessels have no use wear traces on their walls. However, there are

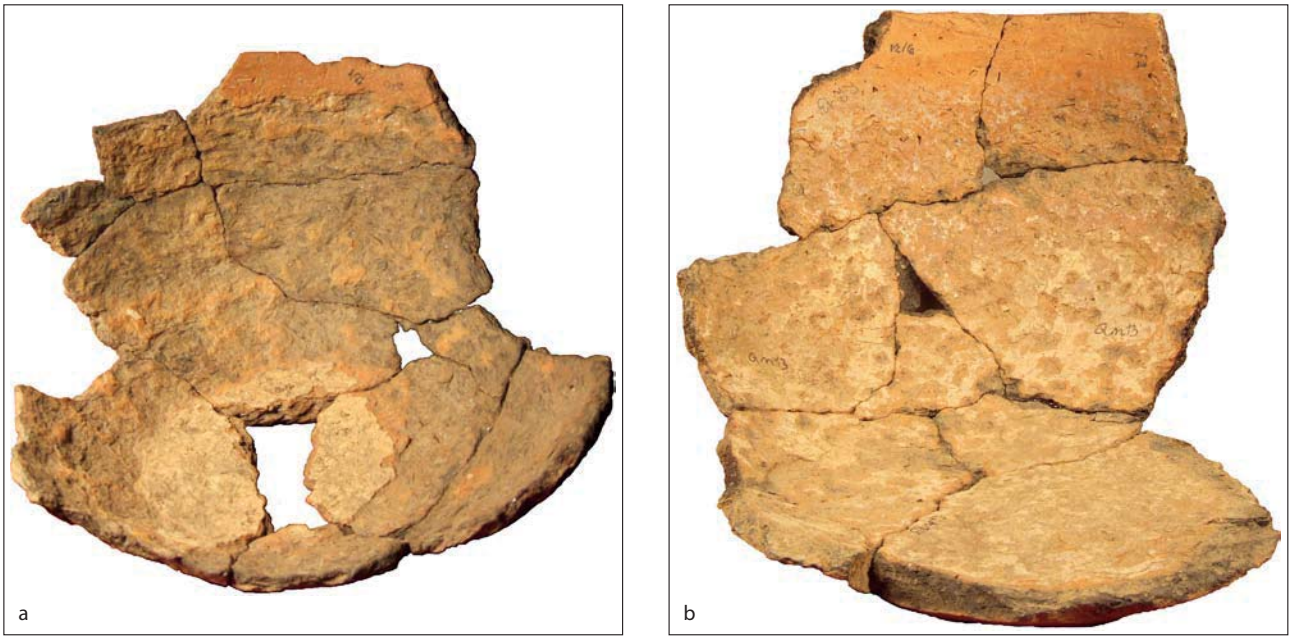


Fig. 1 a Inner walls of a vessel heavily damaged by non-abrasive processes (photo: S. Đuričić).
b Surface pitting on the inner walls of the vessel caused by non-abrasive processes (photo: S. Đuričić).

10 This group stands out within the pottery assemblage from structure 03: eight of ten vessels were found either in one piece or it was possible to reconstruct them.

11 Vuković forthcoming.

12 In traditional typology there are no established criteria on morphological and other characteristics in the identification of cooking vessels. Usually, larger S-profiled vessels made of coarser material and with uneven surfaces are considered to be cooking pots.

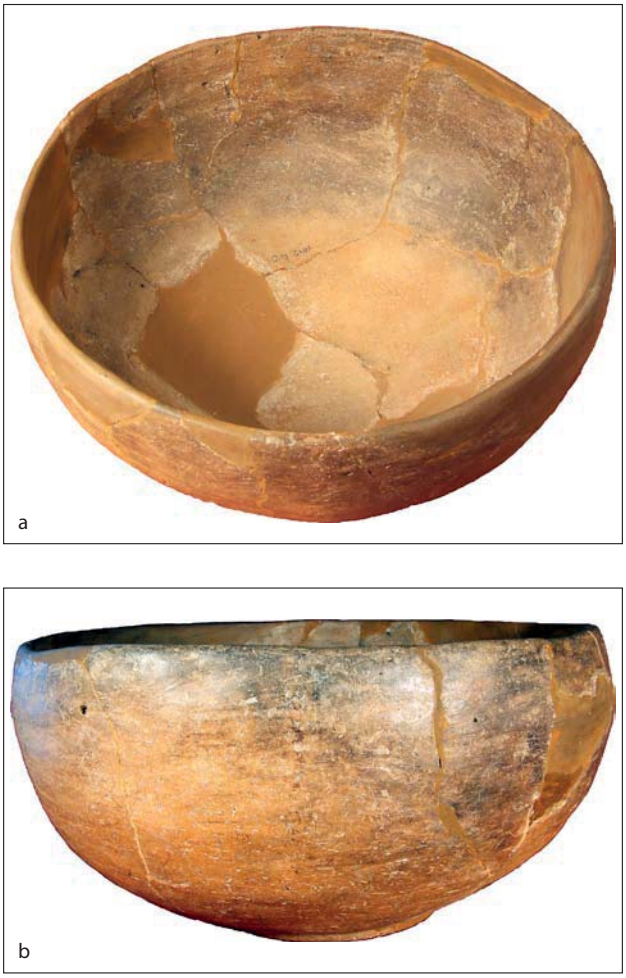


Fig. 2 a Hemispherical bowl with intensive carbon deposits on the whole interior except base (photo: S. Đuričić), b Sooting clouds on the exteriors of hemispherical bowl (photo: S. Đuričić).

several specimens with carbon deposits in the area from rim to the shoulder. The S-shaped vessel in Fig. 3 is the only decorated vessel with carbon deposits on its interior walls (Fig. 3b). It seems that decoration should be also considered in terms of function. Upper part of the vessel has burnished slip, while the lower part is decorated with incised lines that can be functionally considered as surface roughening (Fig. 3a). Plastic ribs in the zone of the longest diameter of the vessel functionally may be considered as a kind of handles. Roughening and the presence of such ›handles‹ make it easier to manipulate the pot. This kind of intervention, besides the aesthetic effect, allows vessel to serve multifunctional purposes: cooking, but also transport and short-term storage, probably of liquids.

Class A2/2: Dry-mode Heating

The presence of carbon deposits on the base of pots suggests heating of foods in dry-mode, like the parching of seeds. Surprisingly, such use-wear traces appear only on small bowls of fine make. A biconical bowl with burnished slip (Fig. 4a – b) shows dark zones in the lower part and the base on both surfaces. There are no visible oxidized patches, so it must be concluded that the vessel was not positioned on an open fire, but above it.

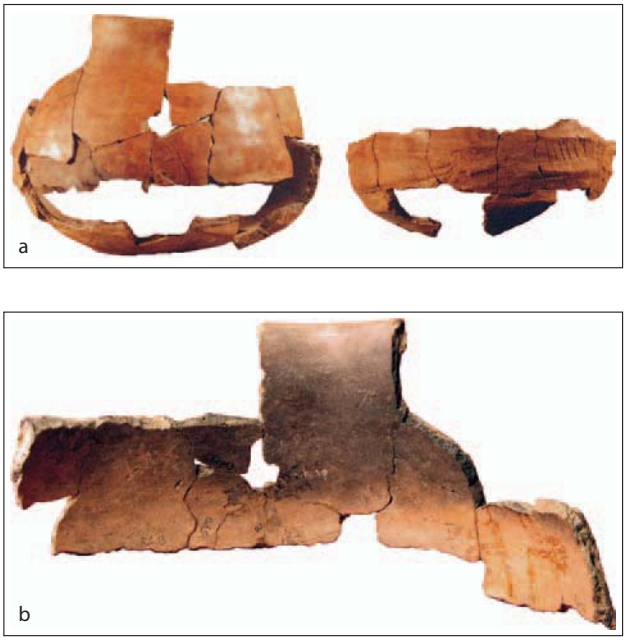


Fig. 3 a Exterior of decorated S-shaped vessel (photo: S. Đuričić), b Interior of decorated S-shaped vessel with carbon deposits in a zone from rim to shoulder (photo: S. Đuričić).

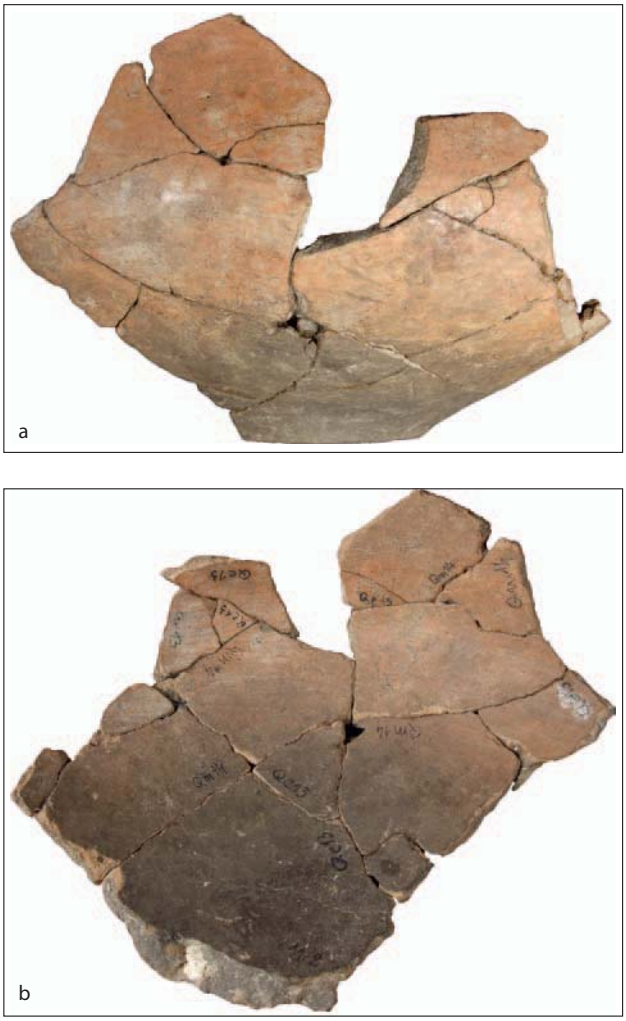


Fig. 4 a Exterior of biconical bowl of fine fabric with dark zones in the lower part (photo: S. Đuričić), b Interior of biconical bowl of fine fabric with dark zones in the lower part (photo: S. Đuričić).

Class C: Storage

The majority of storage vessels are identified by morphological and analysis of formal properties, since use-wear traces usually are lacking in this functional class. They are represented by larger S-profiled pots, with burnished slip inside and different surface treatments on outer walls, often with rib-like handles. They could have been used for storage of dry foodstuffs, such as cereals. On the other hand, pear-shaped vessels with a narrow neck, burnished inner and outer surfaces with slip and four knob-like handles are identified as containers for liquid storage. Sometimes traces of mechanical damage are visible on their outer walls, in zones around the longest diameter and around the perforations of the handles. These traces suggest that vessel was probably tied through the handles with a rope[13].

However, surprisingly again, many traces of mechanical damage are identified within the group of fine pottery. Many of the profiled bowls of fine material have heavily abraded rims and necks (Fig. 5; 6a). Since the temper particles were removed, small pits remained, and the conclusion is that the surface of the rim was in mechanical contact with a harder abrader, like stone or ceramic without organic inclusions[14]. It seems that these vessels were covered with some kind of lid, which caused the abrasion. On the other hand, many of the vessels have use traces along the neck, parallel with the rim (Fig. 5; 6b). These marks may have originated as a result of tying some kind of cover made of soft material, like fur or cloth. Marks parallel with the rim are sometimes visible on the interior walls and they may have been caused by stirring the contents with a utensil. The function of storage is therefore obvious, but it is possible that they have been used for food processing not involving heat as well.

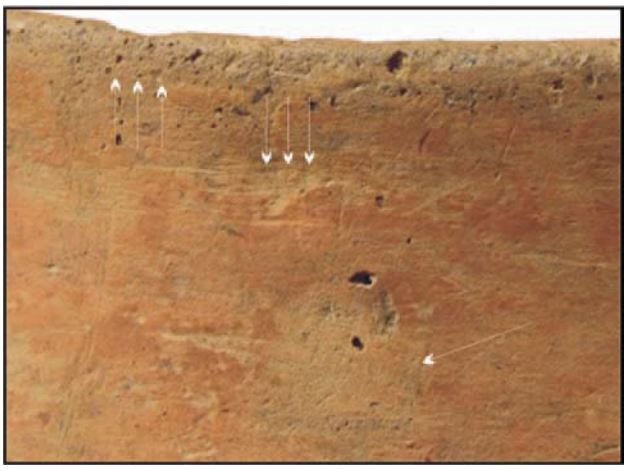


Fig. 5 Upper part of exterior walls of bowl made in fine fabric with heavily abraded rim and neck (photo: S. Đuričić).

Fig. 6 a Upper part of exterior walls of bowl made in fine fabric with heavily abraded rim (photo: S. Đuričić),
b Upper part of exterior walls of bowl made in fine fabric with abraded marks on the neck, parallel with the rim (photo: S. Đuričić).

Discussion

Use-wear trace analysis showed that is possible to determine major functional classes within the ceramic assemblage. Use-marks are identified on three vessel groups: open vessels of medium dimensions, S-shaped vessels and smaller bowls of fine make. Traces can be divided into two basic groups: traces that originated as a result of food preparation (carbon deposits, sooting clouds, traces resulting from non-abrasive processes) and traces that originated as a result of certain activities (abrasion marks on the interiors, which is a result of stirring; abrasion marks on the neck and rim as a result of tying and covering etc.) (Table 1). Use-wear traces are lacking on the large group of vessels, probably used for storage, which suggests they had a static position within the household, i. e. they were rarely moved or handled.

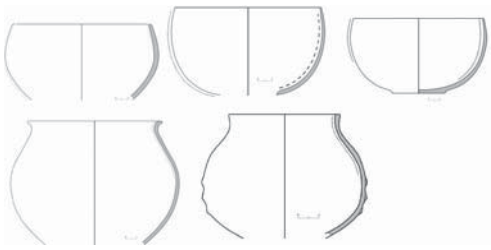
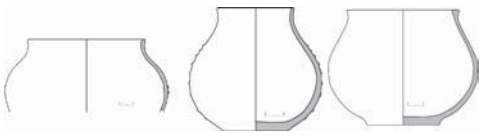
Functional classes of pottery identified by use wear traces are shown in table 2. It clearly reveals that functional analysis has proved to what extent stylistic and typological analyses fall short of providing a comprehensive insight into pottery material. The group of vessels with the function of food processing by non-abrasive processes is typologically diverse. It consists of deeper conical, non-profiled globular and semi-globular bowls. Yet functionally they belong to the same group with important common characteristics: absence of neck, similar dimensions and, most importantly, an open profile. The functional class of wet-mode cooking is even more morphologically diverse: it consists of non-profiled bowls and S-profiled vessels. Some authors suggest that vessels with the function of boiling have open profiles for adding

13 Vuković 2006, 176 f.

14 Schiffer – Skibo 1989,108–111; Skibo 1992,108–110.

use-wear traces	pottery classes	exterior walls					interior walls				
		rim	neck	shoulder	belly	base	rim	neck	shoulder	belly	base
abrasion	open vessels of medium dimensions			x	x	x				x	
	smaller bowls of fine fabric	x	x	x		x			x		
	S-profiled vessels										
non-abrasive processes	open vessels of medium dimensions								x		
	smaller bowls of fine fabric								x		
	S-profiled vessels										
sooting clouds	open vessels of medium dimensions			x							
	smaller bowls of fine fabric				x	x					
	S-profiled vessels										
carbon deposits	open vessels of medium dimensions						x			x	
	smaller bowls of fine fabric									x	x
	S-profiled vessels						x	x	x	x	
oxidation discoloration	open vessels of medium dimensions				x						
	smaller bowls of fine fabric										
	S-profiled vessels										

Tab. 1 Use-wear traces and their position on different kinds of vessels.

function			shape
food processing	with heat	wet-mode	
		dry-mode	
	without heat		
storage/transport	short-term	dry content	
		liquid content	
	long-term	dry content	
		small amounts of goods	

Tab. 2 Functional classes of pottery identified by use wear traces.

and removing food, but the low neck prevents boiling over and reduces evaporation[15]. According to the recent results of chemical analyses of pottery residues, it is possible that different shapes of pots were used for cooking different types of foods[16] and for different cooking techniques[17]. As Eerkens suggests, pots designed for high-temperature boiling tend to have larger and unrestricted openings, while S-profiled walls are better suited for stewing and simmering activities (e.g. 97). In the case of the Blagotin assemblage, this issue, although worth considering, should remain open, since the results of chemical analyses are not available yet.

Another very important issue in the study of Early Neolithic ceramics is the issue of fine pottery. In the literature, it is always considered to be some kind of luxury ware or display pottery with no utilitarian purpose, or with the function of serving and consuming of food and liquids. The main argument is that fine pottery is less frequent within the assemblages than the other kinds. However, functional analysis revealed that bowls of fine material and with burnished slip were used in almost the same way as the other functional classes of pottery. Since this kind of pottery is less frequent than the others, the only conclusion is that these vessels had a longer life than the others and their breakage rate was lower. This means that they weren't moved and manipulated frequently, and were therefore more static than the other classes. The function of storage of goods stored in small amounts (herbs for example) is obvious. Many of the specimens don't have any kind of use wear traces, so the function of serving and consuming also remains.

Finally, it should not be forgotten that many of the vessels were multifunctional, which is, as some authors suggest, one of the important characteristics of early pottery[18]. One of the vessels with traces of non-abrasive processes, for example, has oxidized patches on the lower part of its exterior walls, as well as a small patch of soot on the belly (Fig. 7). Thus, it was used over an open fire, as well as for food processing. The S-profiled decorated vessel shown in Fig. 2 was likely used, as noted before, for several purposes: cooking, transport and storage.

Fig. 7 Exterior of a bowl with oxidized patch in the lower part and patch of soot on the belly (photo: S. Đuričić).

Conclusion

Functional analysis, as shown in the Blagotin assemblage, is very useful in identifying not only the function of pottery vessels, but also in revealing certain aspects of food habits, as well as behavioral patterns related to vessel use and food preparation.

It should be noted, however, that functional analysis is not meant to merely make conclusions about Early Neolithic communities in general, but rather to establish differences between archaeological contexts within one archaeological site, as well as functions of different contemporary sites. For example, large open conical bowls were most frequent in the pottery assemblage from Blagotin. No use-wear traces were identified on them, so it was very difficult to identify their function. They were put in the group of vessels for short-term storage, probably of liquids – water – for everyday use in the household. In the ceramic assemblage from Early Neolithic phase at Lepenski Vir[19] large open conical bowls also predominate. Typologically they are almost the same as the examples from Blagotin. However, there is a major difference between the two sites. Almost all fragments of conical bowls from Lepenski Vir have intensive carbon deposits on the interiors and sooting clouds on the exteriors of the vessels, so there is no doubt that they were used for cooking food. This fact shows that the cooking habits of the inhabitants of these two sites were completely different. Unfortunately no functional analyses of pottery have been conducted on the assemblages from other Early Neolithic sites in the Balkans as yet. Therefore, a comparative functional analysis of pottery from several sites is very much needed. With analyses done, we will have better insights into the everyday life of the people of the Starčevo culture.

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Settlement Organization and Architecture in Aşağı Pınar. Early Neolithic Layer 6

by Eylem Özdoğan

Introduction

During the last decade, research into Turkey's prehistoric cultures has gathered considerable pace, significantly increasing the level of our knowledge; the newly available data not only enable the defining of cultural formations, but more significantly leads to the questioning of previous assumptions[1]. In this respect, the most notable achievements have been on the Neolithic cultures of western Anatolia and Thrace, regions where the very presence of early cultures has been debated. The Neolithic excavations in the area extending from the Aegean littoral to the Marmara region have been yielding astounding results, not only on the cultural sequence of the region, but on the code of interaction between Anatolian and southeast European cultures. Excavations at Aşağı Pınar, located in Turkish Thrace, have revealed an amalgamation of Anatolian and Balkan elements. This paper will be a presentation on the settlement pattern and architecture of Aşağı Pınar Early Neolithic Layer 6.

Aşağı Pınar is located to the south of the city centre of Kırklareli, along the northern fringes of the central basin of eastern Thrace (Fig. 1). The terrain is of significance, as it is at the same time the intersection of the endemic steppe environment of Ergene basin with the forested, mountainous habitat of the Istranca Mountains. Due to its location, the catchment area of Aşağı Pınar includes two diverse habitats, important not only for subsistence, but also in obtaining raw materials. It is also evident that the presence of a freshwater spring must have played an important role; immediately to the northwest of the site there is a major freshwater spring and a small stream. The stream, Haydardere, defines the northern border of the Neolithic settlement; it appears the stream pooled in a depression by the spring before its confluence with İkizdere stream about a kilometer to the west. This small pond seems to have silted up over time, turning into a marshy swamp. The first Neolithic settlement at Aşağı Pınar was founded on the left bank of the Haydardere stream, overlooking the marsh.

The excavations at Aşağı Pınar have been carried out since 1993 by a joint team of the İstanbul University and the German Archaeological Institute, under the co-direction of Mehmet Özdoğan and Hermann Parzinger. Excavations in Aşağı Pınar revealed that the cultural layers at the mound covered a time span between ca. 6200–5000 BC comprising nine cultural horizons, ranging from the Early Neolithic to the Late Neolithic periods, in the sense of Balkan chronological denomination[2]. At present, Aşağı Pınar is the only habitation site in eastern Thrace revealing the entire sequence of the Neolithic period in the Balkans.

Fig. 1 Map of Thrace with Aşağı Pınar and the other contemporary sites.

1 See Özdoğan – Başgelen 2007.

2 See Özdoğan 2007a; Parzinger – Schwarzberg 2005; Karul et al. 2003; Parzinger et al. 1999; Özdoğan et al. 1997.

The earliest layer of Aşağı Pınar, Layer 8, has revealed a predominantly dark-colored monochrome pottery assemblage, though with some painted and/or slip-decorated sherds. Whether or not Layer 8 of Aşağı Pınar is to be considered in association with the ongoing debate on the presence of a ›Monochrome Phase‹ in the Balkans will become clear in future[3]. Nevertheless what is being exposed at Aşağı Pınar is seemingly analogous to the basal levels of Jabălkovo in the Maritsa Basin in northern Thrace[4].

In spite of the uncertainty surrounding the cultural identity of Aşağı Pınar Layer 8, the next stage, Aşağı Pınar 7, clearly represents the so-called Karanovo I phase of Bulgaria[5]. The association of Aşağı Pınar 7 with Karanovo I phase is clear; the extensive presence of white-on-red or black-on-red fine painted pottery, and as well the artifact assemblage presents a picture almost identical to that of Karanovo I itself, however still some odd pieces such as fine bichrome decorated sherds strongly point to regions further west, to the Kremikovci-Starčevo cultural sphere. What is interesting is the fact that the assemblage of Aşağı Pınar Layer 8 is totally different from the contemporary assemblages of the eastern Marmara region. It seems that somewhere between the Bosporus and Kırklareli region there must have been a cultural boundary hampering interaction. This virtual boundary seems to have remained in place from the 6th to the beginning of the 5th millennium BC.

Aşağı Pınar Layer 6: Settlement Pattern and Architecture

In Aşağı Pınar, Early Neolithic layers have only been excavated on the northern part of the mound. The settlement of Layer 6, founded on the southern terrace of Haydardere, extends over an area of about 50×110 m. As the entire settlement was devastated by a fire, the architectural remains are well preserved, making it possible to examine and to document them in detail. The architecture of this layer has been excavated over a considerable area, thus enabling us to understand the layout of the settlement. In an overview, the settlement is an alignment of rectangular rooms adjacent to each other, all being constructed of wattle and daub, with rather large wooden posts (Fig. 2). So far nine rooms have been excavated, aligned in an east-west orientation, though following the curve of the topography. Geomagnetic surveys have indicated that the alignment continues to the northeast outside of our excavations.

Even though the rooms are aligned along an arc, as they are of different dimensions there are considerable overlaps. Most of the rooms have shared walls; also considering their alignment, it is possible to surmise that the settlement was laid out according to a preplanned design. The size of rooms varies between 30–65 m², with two spaces smaller than 15 m². Most of the rooms have no inner divisions with the exception of two large spaces that were evidently divided up by a curtain into north and south sections.

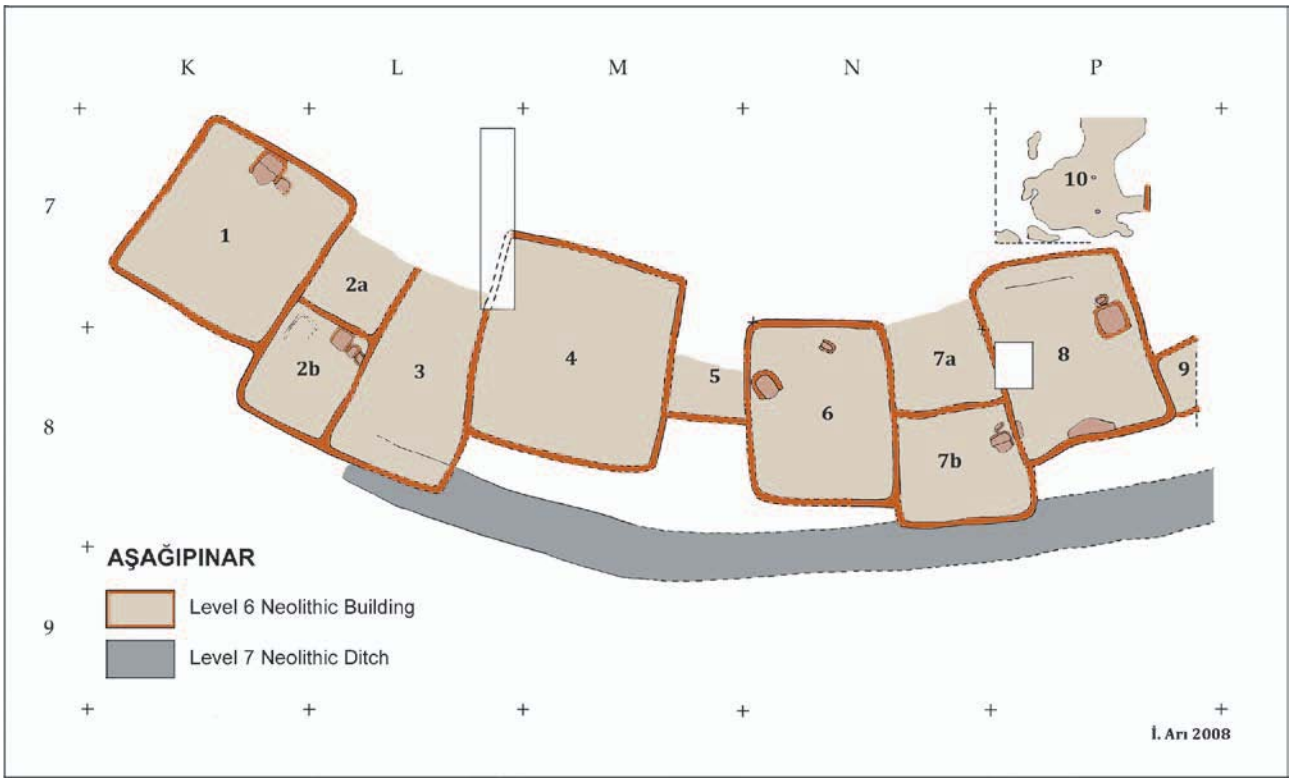

Fig. 2 Plan of Layer 6 in Aşağı Pınar.

3 On the discussion of the ›monochrome‹ pottery in the Balkans see also Krauß, this volume.

4 Leshtakov et al. 2007.

5 History and sequence of the Karanovo culture see Krauß 2008.

It is evident that prior to the construction of Layer 6 buildings, the terrain had been evened, although it maintains the slight rise of the mound. Some of the walls were preserved, up to 50–60 cm in height, making it possible to obtain extensive information on construction techniques (Fig. 3–5). It is evident that the main wooden structural framework of the buildings was made together. The wooden posts have a diameter of about 15–20 cm. A network of thin branches covered the spaces between the posts and twigs that were bound by cords made of organic material, later filled in with

Fig. 3 Rooms 6–8 in Layer 6, from the south.

Fig. 4 Rooms 1–2 in Layer 6, from the north.

Fig. 5 Room 2b and southwest corner of room 3 in Layer 6, from the south.

daub and then plastered (Fig. 6). The floors are of calcareous fill plastered by a clayey soil (Fig. 7). Most of the floors and walls have multiple layers of plaster.

In the course of the excavation along with the *in situ* structures such as the walls, the scattered debris of fragmented daub pieces have also been documented and studied; this time-consuming endeavor has turned out to be most valuable in revealing various details on construction techniques and building materials. As the study is still continuing, we are not yet certain about the roof covering; however, the layout and dimensions of the space suggest that the rooms were covered by a saddled roof. The distribution of the finds and the position of the collapsed walls indicate that at least some of the rooms had second floor or an entresol.

Fig. 6 Wall details in Layer 6.

Fig. 7 Floor of the porch (no. 10) with *in-situ* finds in Layer 6, from the east.

Contents and Functions of the Rooms

There are a number of features common to most of the rooms; however, at the same time there is a considerable diversity among their contents. In this respect, four of the rooms have round or rectangular ovens, while silos are among the standard features of almost every room (Fig. 8). However there is considerable diversity in the locations of the silos, though they are mostly placed close to each other in clusters. Near by the ovens there are some oval work platforms about 30×50 cm and about 20–30 cm high. In room 8a large platform, 150×70 cm was discovered by the southern wall; in the same area a number of massive altars and columnar objects have been found, five of them complete and the rest fragmented[6] (Fig. 9). Similar columnar mud brick objects were also recovered in room 2b, one still *in situ* on the floor, another fallen on the same floor and two others in a pit-like depression by the southern wall of the room. However, it is of interest to note that except for the altars and mud-brick columns mentioned above, no special finds such as cult tables, figurines or anthropomorphic or zoomorphic vessels were found in any of the rooms. It seems evident that the southern parts of room 8 and 2b where these altar-like columnar objects were recovered were reserved as ›special‹ places at least in some parts of these two rooms.

Utilitarian finds that can be considered as prestige objects are restricted to an ear plug, two tokens (?), a clay brush, a stone vessel, two festooned bone objects, and two bone spoons. Besides these special finds, in almost every room there was a rich variety of utilitarian objects such as pottery vessels, clay bracelets, sling missiles, clay covers, loom weights, celts, grinding stones, bone tools and occasionally some beads[7]. Most of the silos and some of the pots were found to contain large amounts of carbonized grain.

The pottery assemblage studied by Heiner Schwarzberg[8] in general bears the characteristic features of Karanovo II of Bulgaria (Fig. 10). Most of the pottery vessels are spherical though tulip-shaped cylindrical vessels, conical or globular deep bowls, plate-like open shapes and cylindrical-necked vessels are also common. Usually the surfaces are well smoothed and polished, coated with a red slipped surface. Color varies in tones of red, reddish light brown, gray-

6 Schwarzberg 2006.
7 Özdoğan 2007b.
8 Schwarzberg's work on pottery assemblages awaits final publication.

Fig. 8 Northwest corner of room 1 in Layer 6, from the south.

Fig. 9 Southeast corner of room 8 with altars (left) and debris of the second floor in Layer 6, from the south.

Fig. 10 Some of the typical whole pots in Layer 6.

ish brown or gray. Usually fine red-slipped wares have white painted linear decoration depicting various geometric motives (Fig. 11). Some fine and medium wares have incised or impressed decorations. Coarse wares are not numerous and rarely decorated.

The number of silos recovered indicates that a great amount of food was deposited within the houses, leaving behind almost no space in which to move within the rooms and evidently no places in which to sleep or to perform daily activities. It is worth noting that in the open spaces excavated outside the houses, no ovens, fireplaces, working areas or processing tools such as grinding stones were recovered, implying that all such activities took place indoors. Considering the dense presence of storage bins and silos on the ground level, we surmise that most of such activities must have taken place either on the entresol or on the upper floor. Nevertheless it is evident that there was a considerable diversity in the function of the rooms which had no ovens and fewer silos. Even though a large number of objects have been recovered, their distribution was more or less the same in every room, and the material assemblage has not been of help in defining functional areas. The only exception is a cluster of loom weights in room 7b, indicating a space reserved for weaving.

Fig. 11 White painted sherds from Layer 6.

Fire

At present we have excavated more than 60 meters of Layer 6 buildings; geophysical prospection suggests there is at least 40 more meters of this architecture. All the excavated buildings have been severely burned and it is evident that rest of the layer had also been burned in the same way. Both the extent of the burnt areas and the type of post-fire deposition lead us to speculate on how these buildings were burnt. An accidental fire would have affected different parts of the structure; considering that the buildings were aligned in curve, whatever the direction of the wind, the fire would not have had the same impact on every part. Thus in such a massive architecture constructed of different of types of organic material it seems impossible that same high temperature would be everywhere. However, in all of the areas we excavated, the pattern was almost the same, thus it is possible to surmise that the fire was under some sort of control. Accordingly we are inclined to consider that the burning was intentional and moreover as it appears to have been controlled, possibly ceremonial.

In this respect it is worth noting that buildings destroyed by similar fires are known from many Early Neolithic settlements in southeastern Europe[9]. Neither at Aşağı Pınar nor at any of the contemporary sites there is there any indication of violence, warfare or looting. This appears to support our theory linking this fire to an intentional, possibly ceremonial action by the local community. This all recalls the custom of house-burials in the Neolithic settlements of southeastern and central Anatolia[10]. Considering the presence of house models at a number of sites and the custom of burying houses, it is evident that houses attained a symbolic value beyond being simple shelters to live in. Also considering the extensive practice of burying buildings in settlements where the architecture is primarily of stone or mud brick, one would also wonder how this tradition could be implemented in cultures using only wattle and daub; thus we may assume that burying replaced burning. However, it is much harder to tell the difference between intentional and accidental fires than it is to determine that a building was buried; accordingly at Aşağı Pınar we searched for other evidence; the skeleton of a sheep found in room 2b (Fig. 12), supports the intentional burning theory in Aşağı Pınar. This sheep skeleton was found in a lying-down position on the floor, surrounded by pots. The skeleton was in bad condition due to the fire, but both its position and the finds around it lead us to consider that the sheep was put inside the house before the fire, possible as a sacrifice.

Fig. 12 Sheep skeleton in room 2a in lying position on the floor, surrounded by pots.

Cultural Formation and Architectural Patterns

Our knowledge of earliest horizon of Aşağı Pınar, Layer 8 is still very limited, but the pottery indicates that it predates Karanovo I period. A preliminary analysis of Layer 8 material is highly indicative of the so-called ›monochrome‹ horizon of the Balkans[11].

The next horizon, Layer 7 of Aşağı Pınar, is marked by a well-plastered ditch running through the southern edge of the settlement. To the north of ditch, underlying and badly damaged by the architecture of Layer 6, a number of clay floors were found. Accordingly, what could be discerned of

9 Stefanović 1997; Stefanović 2002; Stefanović – Tringham 1998; Tringham 2005.

10 Özdoğan – Özdoğan 1998.

11 Todorova 1990; Todorova 2003.

Layer 7 is at present rather limited; still the material in the ditch has provided ample evidence to date Layer 7. The fact that rooms 2 and 3 of Layer 6 were built above the ditch indicates both the stratigrapic positioning of the ditch and that it was no longer in use during Layer 6. Nevertheless a part of the ditch in its eastern extension must have remained as a depression during Layer 6 as some of the burnt debris of this layer had accumulated in it. The materials in Layer 7 are almost identical to those of Karanovo I in Bulgaria and evidently there is a link to the Karanovo II period. In spite of the similarities among the assemblage of layers 6 and 7, the pottery of Layer 7 is much finer and the ratio of painted, decorated sherds is considerable higher.

As noted above, the assemblages of layers 7 and 6 display typical features of Karanovo I and II phases of Bulgaria, as well as of the eastern Balkans. However, the architectural pattern and in particular the layout of the settlement is notably similar to that of southeastern Marmara. The Neolithic sites of the Marmara region, the agglomerate design of the central Anatolian plateau as known from sites Aşıklı Höyük, Çatal Höyük and Canhasan, had been replaced by a linear pattern as revealed at sites such as Ilıpınar and Aktopraklık[12].

Parallels between Aşağı Pınar and the sites in Bulgaria can also be seen in the Aşağı Pınar 6–5 transitional stage that corresponds to the Karanovo II – III[13]. During this stage characteristic features of the Karanovo II horizons remain, but the typical shapes and decoration of the following stages also begin appearing. The architectural remains of this phase at Aşağı Pınar consist only of broad and shallow pits, suggesting the presents of circular or oval hut-like structures.

What has been observed in Thrace during the Karanovo II – III transition appears to have parallels in the southeastern part of Marmara as evidenced by excavations Aktopraklık and Ilıpınar[14]. In both of these settlements there is a marked changed in architecture, rectangular plan types being replaced by oval plans of hut-likes structures that are evidently free standing[15]. It is thus significant that the linear arrangement with large structures gives way to small dwellings. The changes in the architecture are also to be seen in the material assemblages, possibly reflecting the emergence of a new social system. The cultural changes in the Marmara basin are somewhat similar to the transition from the Starčevo to Vinča Culture in the western Balkans, which is contemporary with the Karanovo II-III period[16].

Evidently the settlements in the southern part of the Marmara region came to an end by this period; however the occupation history of Aşağı Pınar continued. At Aşağı Pınar this new phase has been denominated as Layer 5; during this period the area of settlement increases considerably and rectangular planned houses reappear. All buildings are free-standing, placed close to each other, and consist of one or two rooms. Even though there is no break between Layers 5 and 4, the architectural layout has been slightly modified, some of the buildings now having a second floor. In Layer 3 there is again a slight modification of the architectural practices, with buildings becoming longer, and occasionally having three rooms. The buildings of this layer seem to be randomly placed with no indications of pre-planned settlement organization. Even though we don't yet have any evidence on the extent of the settlement area, a wooden palisade reinforced with stones has been recovered in the north eastern part in Layer 3 which may also have been used in Layer 2[17].

There is a marked change in Layer 2, where it appears the structural system of the previous era consisting of saddle roof supported by straight walls is abandoned. All buildings of this phase have walls notably inclined to form a ›crag type‹ of structure; thus the roof becomes a continuation of the side walls. Even though only a small part of the settlement has been excavated, we can say that the structures of this era were set closely side-by-side, oriented in a northeast-southwest direction. The final layer, Layer 1 has been so disturbed that neither the architectural practices nor settlement pattern are discernable.

The pottery assemblage in layers 5–2 of Aşağı Pınar, which correspond to Karanovo III and IV, is mostly made up of well-polished wares with dark colors[18]. Carinated and biconical bowls, pots with long necks and flat-sided plates are typical vessel forms of this period. The other components of the assemblage are similar to those known as Karanovo III – IV from Bulgaria.

Concluding Remarks

With this paper we have sought to present our initial observations on the architecture of Layer 6 of Aşağı Pınar. As briefly described above, the architecture of this layer consists mainly of a row of substantial buildings, relatively well preserved due to the intense fire that devastated the settlement. A rich and varied assemblage had been recovered with the buildings; in an overall assessment the assemblage is identical to that of the Karanovo II culture of eastern Bulgaria, leaving no doubt about the sequential position of this horizon. On the other hand, the similarity in the layout of the Layer 6 settlement with those of Anatolia is rather conspicuous and needs to be confirmed by further research.

Layer 6 of Aşağı Pınar represents the final stage of the cultural continuum; the climax is evidently the Layer 7, the Karanovo I epoch, which unfortunately is poorly preserved at Aşağı Pınar. Nevertheless, as in most of the contemporary settlements in the Balkans, the cultural seriation at Aşağı Pınar is also interrupted at the end of Layer 6. Layer 5 of Aşağı Pınar the next stage to be represented by substantial architecture was considered to be the beginning of a new era; however what has been discerned at Aşağı Pınar as Layer 5–6 transition clearly revised that the break between the to cultural stages was not as abrupt as previously considered. In broader terms the transition layer 5–6 at Aşağı Pınar cor-

12 Roodenberg – Alpaslan Roodenberg 2007; Karul 2007; Schoop 2005.
13 Nikolov 1995.
14 Thissen 2008, 99.
15 Roodenberg 2001, fig. 15.
16 Brukner 2006; Nikolov 1995.
17 Karul 2003.
18 Parzinger 2005.

respondence to the Starčevo-Vinča transition in the western and central Balkans. It is also of interested to note that almost at the same period a similar cultural changed occurred in southeastern Marmara region. The motives beyond this cultural transformations that took place in a considerably large area needs to be further elaborated in the future; here, with this paper we tried to draw attention to this old problem with the new evidence from Aşağı Pınar.

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